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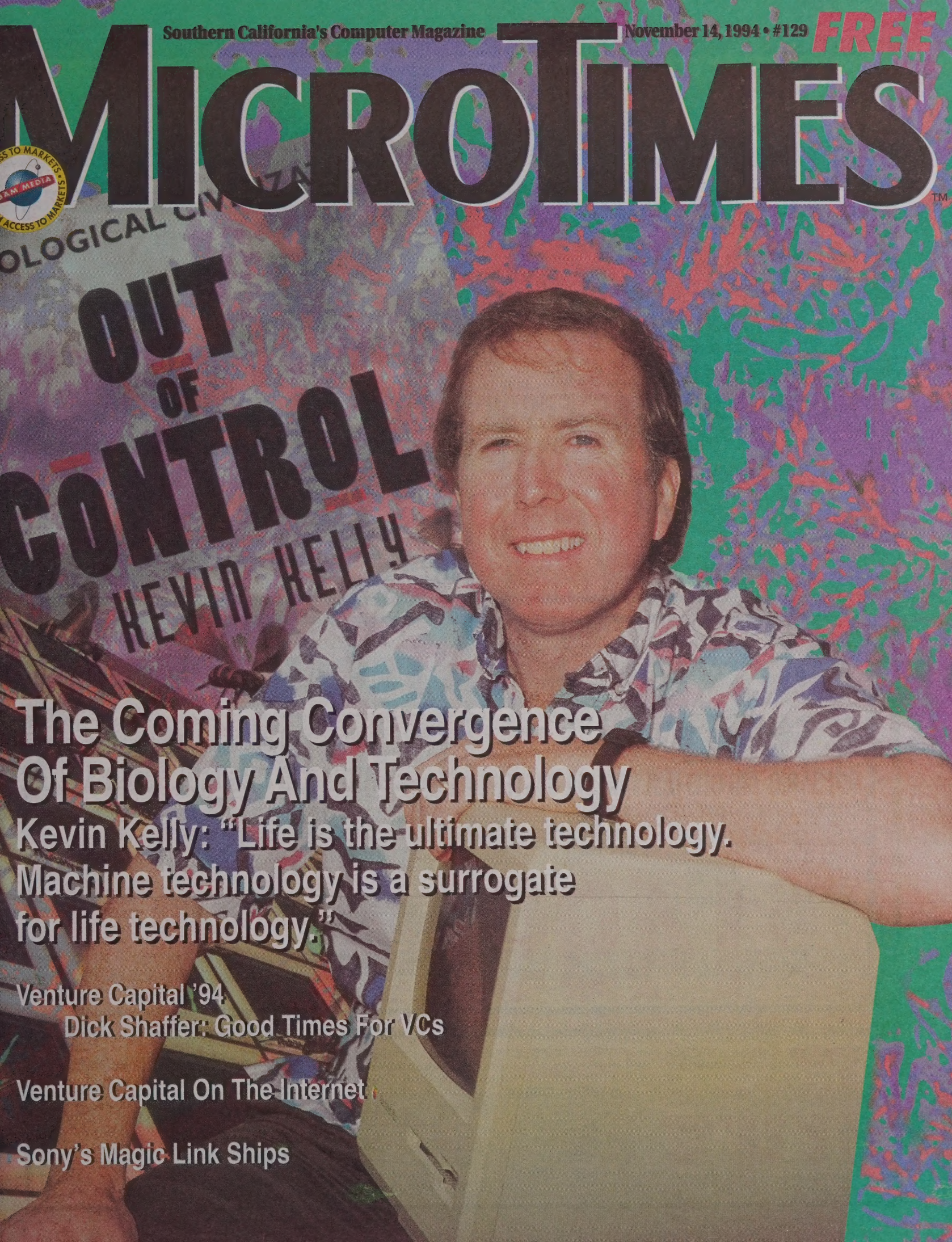

The Coming Convergence Of Biology And Technology

Kevin Kelly: "Life is the ultimate technology. Machine technology is a surrogate for life technology."

Venture Capital '94
Dick Shaffer: Good Times For VCs

Venture Capital On The Internet

Sony's Magic Link Ships

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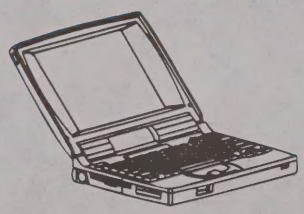

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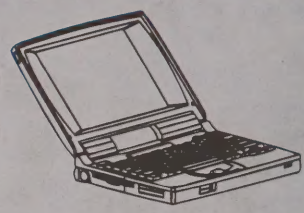

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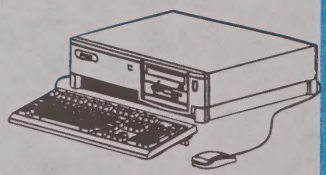

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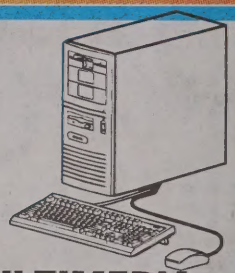

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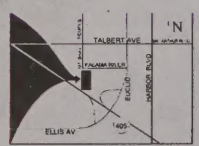

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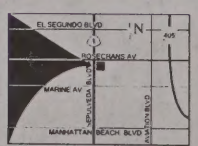

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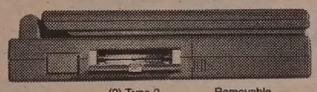

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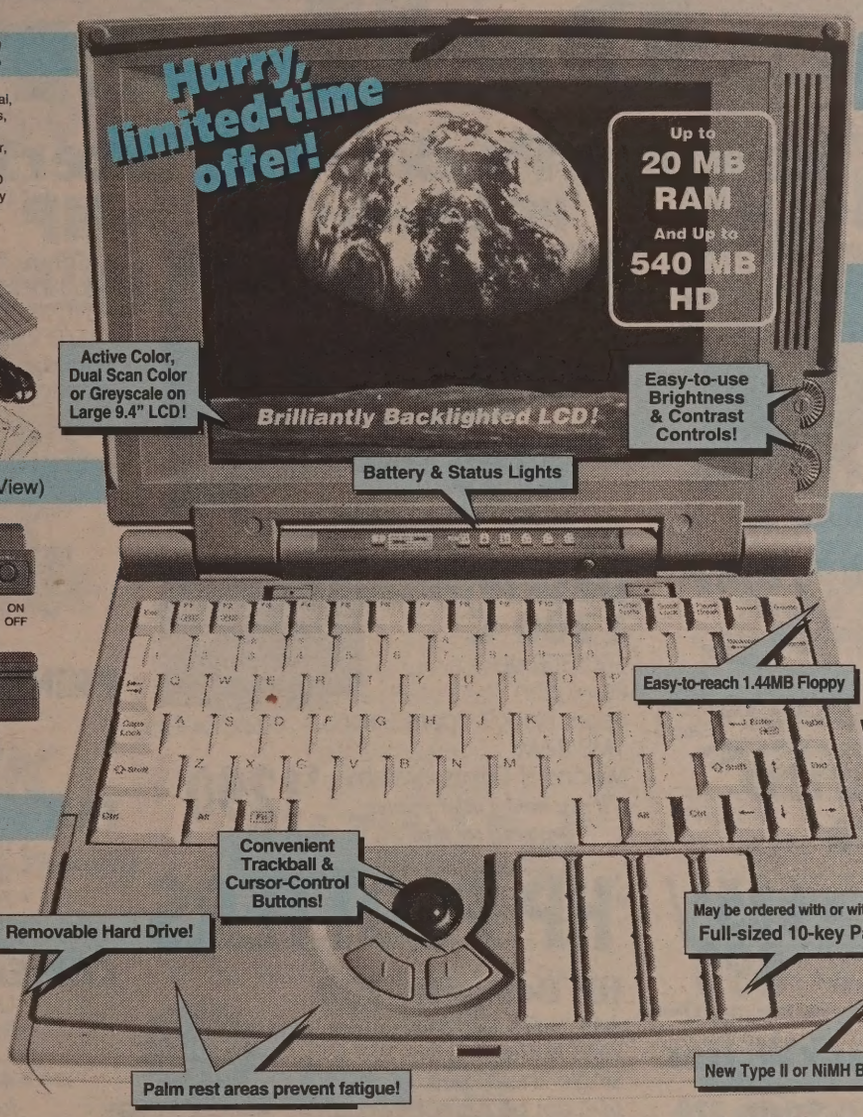
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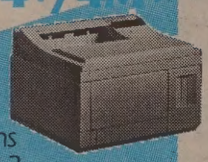

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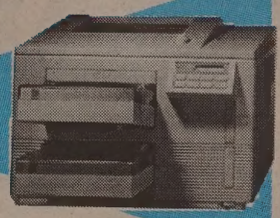

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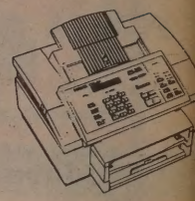

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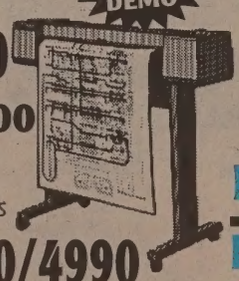

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EXTRA

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Venture Capital Good Times For VCs
BY MARY EISENHART

Checking in with Dick Shaffer of Technologic Partners on the eve of his next industry gathering, we find him bullish on the state of the investment community. Also, some venture capitalists talk about their use of the Internet.

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Apple Macintosh 4MB 250HD

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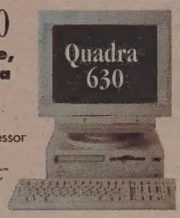

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Apple Macintosh 4MB 160HD

Performa® 475*

Complete System

- Performa 475 4/160 (68LC-040, 25MHz processor)
- Apple Performa Plus Color Display (.28 Dot Pitch)
- Apple Standard keyboard
- Teleport Fax/Modem (with Send Fax)
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Free software: System 7.1P with Launcher, At Ease™ and Macintosh PC Exchange™, ClarisWorks 2.1, Quicken 4, Best of Home Works Templates, Click Art Performa Collection, Special Edition of America On Line 2.1, TelePort Fax/Modem Software, American Heritage Dictionary 3rd Edition, Mario Teaches Typing, Spectre Challenger, Super Munchers.

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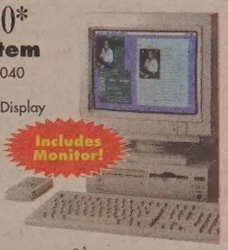

- Performa 630 4/250 (68LC040 66/33 MHz processor)
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- 66MHz Power PC™ 601 RISC processor
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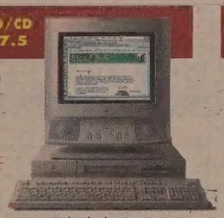

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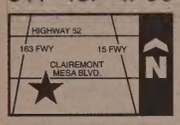

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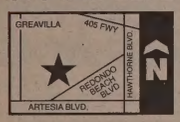

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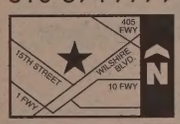

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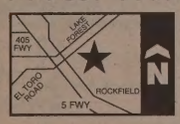

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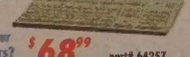

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- KFC 15" 1280 x 1024 .28 NI SVGA Monitor
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- 2 Serial, 1 Parallel, 1 Game Port
- 101 Keyboard
- Hi-Resolution Mouse w/Pad
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- 16 Bit Sound Blaster Compatible Card
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- 2 Serial, 1 Parallel, 1 Game Port
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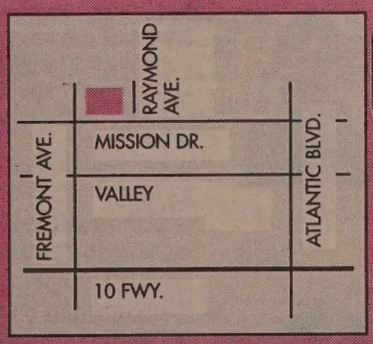

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MICROTIMES
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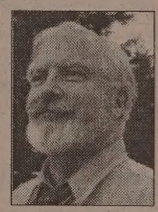

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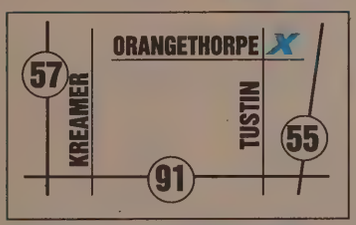

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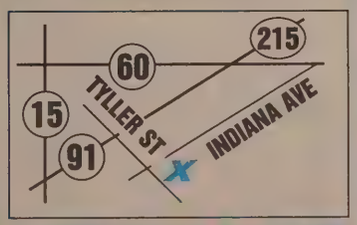

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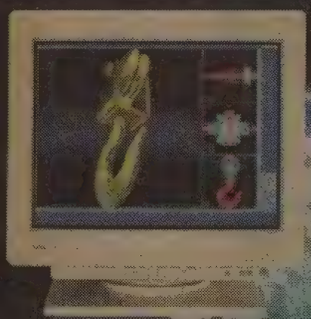

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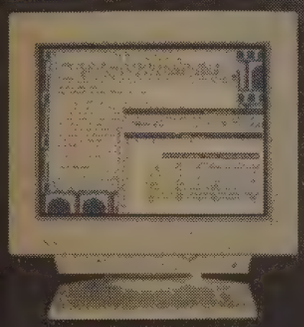

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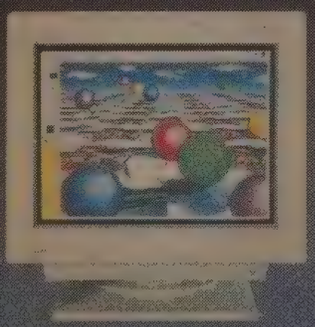

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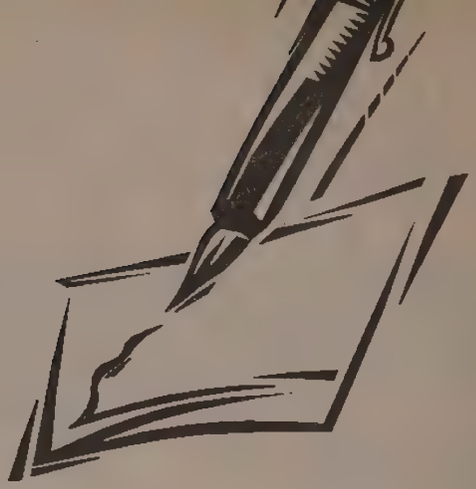

Letters

Mac Chauvinists?

I have long noted an unfortunate tendency of Macintosh users to rewrite history. In a recent article David Morgenstern writes "the whole concept of plug and play computing was introduced to the desktop world ten long years ago with the Macintosh."

Ten years ago absolutely nothing would "plug" into the Macintosh. Steve Jobs had decided that nobody would "need" a hard drive. Many of the theorists at Apple felt that networking would reintroduce the evil centralized computing environment. The machine was a standalone device, a completely "personal" computer.

This is one of the reasons that the IBM PC came to dominate the business market. By the mid-'80s most serious users wanted hard disks and local area nets. These were not availible for the Mac until the late '80s. Even today the Apple idea of "connectivity" (AppleTalk) is inferior to products that PC users had seven or eight years ago.

The Mac is superior to Windows when it comes to building a tight integrated "personal environment.. How important this is in actually using the computer to do real work is questionable, but admittedly it is an "aesthetic experience."

When it comes to doing "group work," the Mac is now competitive with the PC. But this is only because companies such as Novell have extended PC-based applications to the Mac. To pretend otherwise is show a disregard for history.

D Bennett
San Mateo

OS/2 Memories

It was very interesting to read the article "Memory Managers" by Woody Liswood in your recent issue of *MicroTimes*. But I do not understand why anyone would want to spend anywhere from $40 to $150 to purchase any of the memory managers listed in the article, when OS/2 (2.1 for Windows, $14.95 at its lowest) has it built into the operating system. I can get up to 740,333 free bytes (more than any of the Managers listed in the article) available for a DOS session, even with a CD-ROM drive and all other drivers! True, I cannot use graphics in that session, but then to use a DOS graphics program I can always start another DOS session! Those 150,000+ extra bytes for a DOS session have helped me save a few thousand dollars by not purchasing the Plus versions of the DOS structural analysis software that we use at work on a daily basis, which runs faster and can handle bigger problems with more memory.

It is really strange that OS/2 has not been so popular yet. None of my Silicon Valley friends had ever heard of OS/2 until I talked to them about it.

It is good to see you cover OS/2 more than another leading computer magazine I subscribe to. Please keep printing those articles.

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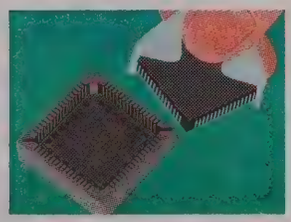

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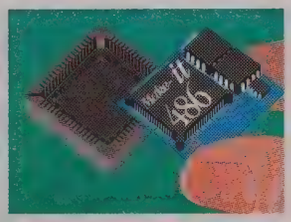

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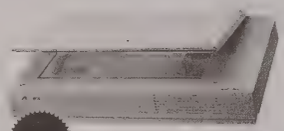

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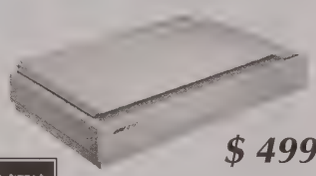

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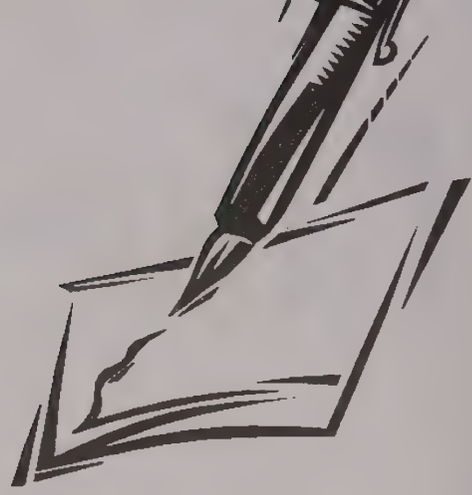

Letters *continued from page 14*

Shopping Hell Revisited

I am moved to tell you how much I enjoyed your most recent issue. As a very recent Mac purchaser, I was especially entertained by Jonathan E. on the mad hunt for the perfect setup. I hope you send him out in search of my next target: the right Internet connection.

Keep up the good work, and keep an eye on us Appleheads.

Lenny D.
San Francisco

Telecommuting In The Global Village

The argument against telecommuting as a way to "play hooky" from work (Letters, Issue 127) presented some interesting issues, but is based upon a faulty assumption shared by most major corporations.

I agree with the assumption that employees who are paid hourly for "working time," rather than paid as independent contractors for results or lines of code or some other measurable amount of production, would abuse the telecommuting privilege by simply keeping their machines on while they are not really working. But the solution is not to abandon telecommuting, but to rethink the concept of time-based compensation as a relic from the industrial revolution of the last two centuries, no longer appropriate for the global village of the twenty-first century.

Both tax and labor laws need to be rewritten to utilize the growing number of home workers who add value to a product, but simply do not fit into the typical hourly worker rules.

And as the Internet does not distinguish between a programmer who does his or her work in Mexico, India, or the United States, although the standards of compensation and tax laws may vary greatly, whatever those rules are going to be, they should be made with an eye toward universal applications.

Mark R. Thierman
Piedmont

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GDM-17se
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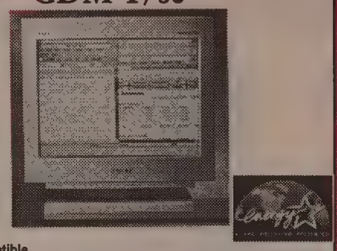

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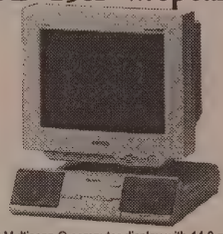

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- Trinitron® technology delivers bright images and vibrant colors
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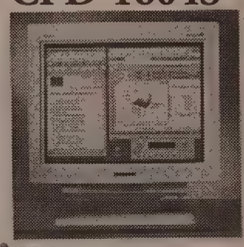

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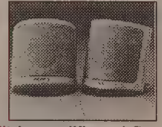

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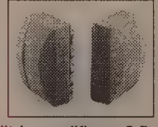

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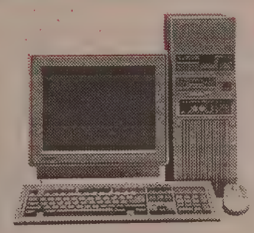

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BY PAUL HOFFMAN

Industry Insight

Smaller, Faster, Cheaper Pentiums—But 486s Still Sell Well

Intel has started discussing the next round of improvements to its line of CPUs, and the news is pretty much what many expected: most of Intel's emphasis is on the Pentium line. Because of recent encroachments on its 486 market by AMD and Cyrix, Intel is trying to make it look like the PC market is the Pentium market, and nothing else matters. Even with the expected price cuts and speed improvements in the Pentium chip over the next year, Intel cannot succeed in this goal.

For example, Intel has taken out ads in many computer magazines indicating that the 486 processor is all but dead. The ad shows three sets of nine cats, representing PCs based on 386, 486, and Pentium processors. All the 386 cats have red Xs through them, and seven of the nine 486 cats do too; of course, none of the Pentium cats do. Intel wants you to believe that 80% of the 486-based systems on the market are dead.

According to consumers, this simply isn't the case. The best example of this is the laptop market, where the Pentium has less than 5% of today's sales, and no one expects it to go much higher over the next year because a Pentium CPU can drain a battery incredibly quickly. The portable market continues to grow for many reasons, and many manufacturers are finding that many people want a portable at home simply because it is smaller than a desktop PC.

The market for 486 systems is also incredibly strong for mass-merchandisers like the warehouse stores and electronics emporiums. Almost every such store now has a $1500 multimedia system that is little more than a 486 (or, unfortunately, a 486SX) system with a CD-ROM drive, speakers, and two pieces of old CD-ROM software. A few also have higher-end Pentium-based multimedia systems, but salespeople at the stores say that the more expensive systems only sell to people who are also setting up home offices, while the cheaper systems sell to families who want it for the kids.

Intel's push in the Pentium market next year could possibly make a difference for these systems. Due to better manufacturing and smaller chips, the price of the low-end Pentium CPUs will probably drop by as much as 40% over the year. Intel is expected to phase out its 60MHz Pentium for a 75MHz model and drop the price. At the high end, many hardware manufacturers are already planning for new 120 and 150MHz Pentiums.

> "Because of recent encroachments on its 486 market by AMD and Cyrix, Intel is trying to make it look like the PC market is the Pentium market, and nothing else matters."

However, Intel is not alone in the market. AMD, Cyrix, and NexGen are all working on Pentium-class processors that will probably be introduced within the next six to nine months, if not sooner. These chips will give consumers even more choices, but they will also probably force the price of AMD and Cyrix 486 chips down further. This means that today's $1500 multimedia PC, which shows video from CD-ROM with terrible results, could instead have a low-end Pentium or a high-end 486, and therefore be a much better platform.

Which Superhighway? For Most People, Entertainment Is Still King

The computer industry's current holy grail, a map to the Information Superhighway, is looking harder and harder to find. The hard part here seems to be that the consumer public is just not as interested in "information" as we dweebs in the computer industry are. Sure, the fastest CPUs and the best network connections are being used to exchange "information" and "data" with others; however, they're also being used mostly to play games and watch.

A few companies are catching on. For example, Compaq and AST have started advertising their consumer-targeted multimedia PCs in game players' magazines. Nary a spreadsheet or word processor is mentioned in the ads. Of course, these companies are also still going after the corporate, small office, and home office mar-

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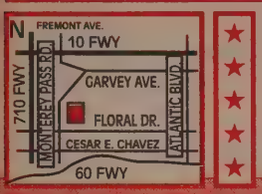

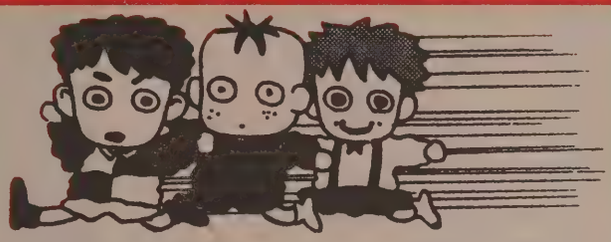

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kets, but they are also realizing that many systems are being bought for little else than to play cool games.

This makes sense if you look outside of the computer market. Over a hundred million people watch at least an hour of television a day; many watch three or four hours. Only a tiny fraction of these hundreds of millions of hours are spent watching "information": they're mostly watching entertainment. Even the few high-information channels that are popular, such as CNN and Discovery, have a surprising amount of information about entertainment such as sports.

Computer-based games are doing increasingly well as more people have home systems with CD-ROM drives and fast graphics built in. New games are anticipated as much as new versions of business software, as evidenced by the current hype for Doom II, a fairly violent shoot-'em-up game that's the successor to the popular Doom.

> "The consumer public is just not as interested in 'information' as we dweebs in the computer industry are."

Because packages like the new Lotus, WordPerfect, and Microsoft suites cost ten times as much as the popular games, they certainly get more publicity and reviews. However, there is no dearth of coverage for new PC and Macintosh games.

Still, the real question is, "What does the non-computer audience want?" You can only go on so long creating hardware and software for the current market. The much-hyped answer seems to be "set-top boxes," tiny computers that will work with your cable system to let you interact with your television and have two-way communication with, well, somebody. However, every test of interactive television that has been tried has shown that people don't want to interact and are perfectly happy with their current mode of two-way communication with the somebodies out there: the telephone.

The set-top boxes, if they ever become popular, will give consumers the same choices as they have now for television: entertainment and information. Guess which will win? Actually, probably neither. Interactive television requires you not to stare blankly at the screen for long periods of time, which is precisely what many people do because that's precisely what they want to do. Interaction will probably be more useful for asking questions, like "What else is on other channels right now?" But look at how many people would rather channel scan or just watch whatever's on now than even pick up the *TV Guide*.

The "promise" of set-top boxes is the same as the promise of homes with a single programmable central control: great for a few, probably overpriced for many, and of no interest to the vast majority. Look at the failure of pay-per-view and video-on-demand: almost no one trusts their cable company or phone company as much as they trust their local video store. Even the worst video store often has better customer service than the best cable or phone provider. Because of this, most people are willing to sacrifice convenience, and often price, in order to go rent a movie instead of using pay-per-view and video-on-demand.

Many people are hoping that, if you can't bring computers to television via the set-top box, maybe you can bring television to computers. Some of that is happening today with the proliferation of hardware that allows you to turn your television into a computer monitor. For $300 to $500, you can use your TV screen for playing your favorite games on a much larger screen. Or, you can get cards that allow you to watch TV on your PC or Macintosh screen as you "work." However, these systems are not that popular—they cost more than a high-quality, regular size television.

Most people do not want interactive entertainment, regardless of how much fun it seems to those of us in the computer industry. This is not necessarily a bad thing. A hundred years ago, sitting quietly and reading a book or writing a letter was considered to be a more valuable pursuit than, say, playing a game of cards with friends. Today's interactive books on CD-ROM are interesting to some, but many families have found that they are used once or twice by the children, then abandoned. At $20 to $50 per book, it doesn't take long for a parent to decide not to invest in more titles.

This is not to say that the Information Superhighway is dead, just that it might not be so super. It is sure to grow, but it will almost certainly level off well before today's computer industry hopes it will. There is definitely a desire for information: look at how well many nonfiction books sell. On the other hand, look at how much better fiction sells. A great-selling nonfiction book might not even compare with the sales of the Top 10 list for fiction during the same week. Clearly, the same is true for the most popular television shows.

Today, the most popular information on the Internet could most likely be called entertainment, if we were honest about it. The most popular news groups are about sex and sports. The most popular graphic downloads, outside of pornography, have been the Shoemaker-Levy 9 comet's collision with Jupiter; let's face it, the average person looking at these pictures is far more driven by the desire for entertainment than by any scientific exploration. The most popular spots on commercial services like CompuServe and America Online tend to be the social areas.

Maybe there's a third possibility for the Superhighway: human-to-human communication. People don't usually classify the telephone as an information or entertainment tool because almost everyone uses it for both. What they really use it for is to communicate with other people (or other people's answering machines). Electronic mail has always been the most used service on the Internet, and many Internet providers find that many new clients do almost nothing else. The personal digital assistant market has so far been a complete bust, but there may be room for a few low-cost systems that do not do much more than let you send and receive email and voice messages. ■

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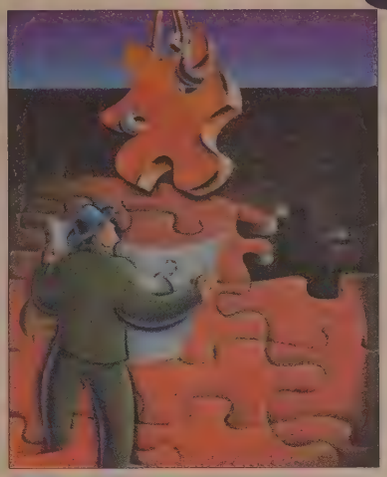
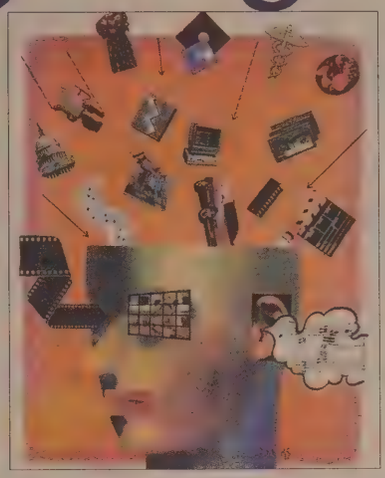


DOS 6 utilities—handy, but about 120K



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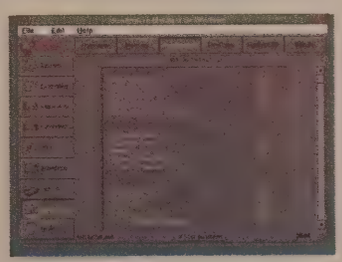

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OTC	Borland		BORL	12.38	10.50	-1.88	-15.15	-	0.00	0.00	18.25	8.50
OTC	Informix	(H)	IFMX	23.25	27.25	4.00	17.20	30	0.00	0.00	28.75	14.25
OTC	Lotus		LOTS	42.81	37.50	-5.31	-12.41	-	0.00	0.00	86.50	29.75
OTC	Microsoft	(H)	MSFT	56.88	61.63	4.75	8.35	31	0.00	0.00	61.63	38.00
OTC	Novell		NOVL	15.31	17.00	1.69	11.02	22	0.00	0.00	26.63	13.38
OTC	Oracle	(H)	ORCL	44.00	44.19	0.19	0.43	42	0.00	0.00	46.50	26.25
OTC	Software Publishing		SPCO	4.75	5.38	0.63	13.16	-	0.00	0.00	8.63	3.00
OTC	Symantec		SYMC	15.88	16.81	0.94	5.91	99	0.00	0.00	20.25	9.88
	HARDWARE											
OTC	Apple	(H)	AAPL	36.38	42.75	6.38	17.53	16	0.48	1.12	43.25	24.63
OTC	AST Research	(L)	ASTA	14.00	12.13	-1.88	-13.39	7	0.00	0.00	33.00	10.38
NYS	Compaq		CPQ	37.63	38.75	1.13	2.99	15	0.00	0.00	39.88	21.13
NYS	Digital Equipment		DEC	25.00	30.25	5.25	21.00	-	0.00	0.00	38.63	18.25
OTC	Dell	(H)	DELL	37.38	41.88	4.50	12.04	24	0.00	0.00	43.50	19.13
NYS	Hewlett-Packard	(H)	HWP	91.13	95.88	4.75	5.21	17	1.20	1.25	95.88	70.13
NYS	IBM	(H)	IBM	71.00	74.13	3.13	4.40	21	1.00	1.35	76.13	45.75
NYS	Silicon Graphics	(H)	SGI	24.88	30.25	5.38	21.61	30	0.00	0.00	30.38	18.75
OTC	Sun Microsystems	(H)	SUNW	27.88	32.25	4.38	15.70	14	0.00	0.00	33.38	18.25
NYS	Xerox	(H)	XRX	105.13	102.00	-3.13	-2.97	18	3.00	2.94	112.75	78.38
NYS	Tandy		TAN	42.75	43.75	1.00	2.34	17	0.60	1.37	50.75	30.75
	CPU'S											
NYS	Advanced Micro Devices		AMD	30.00	25.88	-4.13	-13.75	8	0.00	0.00	31.75	16.75
OTC	Intel		INTC	66.88	60.50	-6.38	-9.53	11	0.24	0.40	73.50	55.88
NYS	LSI Logic	(H)	LSI	35.13	39.38	4.25	12.10	24	0.00	0.00	40.50	13.00
NYS	Motorola	(H)	MOT	54.50	56.38	1.88	3.44	24	0.28	0.50	57.38	42.13
	COMMUNICATIONS											
NYS	AT&T		T	54.88	53.13	-1.75	-3.19	18	1.32	2.48	58.38	49.50
NYS	BellSouth Corp.	(L)	BLS	57.63	51.38	-6.25	-10.85	19	2.76	5.37	63.50	50.75
OTC	MCI		MCIC	24.75	22.50	-2.25	-9.09	17	0.05	0.22	29.13	21.38
NYS	Northern Telecom	(H)	NT	37.25	35.50	-1.75	-4.70	31	0.36	1.01	37.75	26.00
NYS	Pacific Telesis		PAC	33.13	31.25	-1.88	-5.66	28	2.18	6.98	34.50	29.41

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	19
DECLINES	11
UNCHANGED	0
NEW HIGHS	15
NEW LOWS	2

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Apple	$	6.38
LARGEST DOLLAR LOSER	Intel	$	-6.38
LARGEST PERCENTAGE GAINER	Silicon Graphics		21.61 %
LARGEST PERCENTAGE LOSER	Borland		-15.15 %

	CLOSE 09/16/94	CLOSE 10/27/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD
MICROTIMES STOCK INDEX	5323.66	5478.47	154.81	2.91
DOW JONES INDUSTRIAL AVERAGE	3933.35	3875.15	-58.20	-1.48
STANDARD & POOR'S 500 INDEX	471.19	465.85	-5.34	-1.13
N.Y.S.E. COMPOSITE	259.77	255.57	-4.20	-1.62
NASDAQ COMPOSITE	777.91	767.47	-10.44	-1.34

CLOSING QUOTES FOR GRAPH:

DATE	MICRO TIMES	DOW JONES
04/05/94	4878.26	3675.41
04/29/94	4639.86	3668.31
05/27/94	4709.29	3757.14
06/24/94	4238.94	3636.94
07/22/94	4577.29	3735.04
08/19/94	5070.19	3755.11
09/16/94	5323.66	3933.35
10/27/94	5478.47	3875.15

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High-tech stocks bucked the national downtrend in stock prices during the period September 16–October 27.

During that time span, the MicroTimes Stock Index, which monitors the financial health of the companies in the accompanying table, sprinted forward a spirited 154.81 points, or 2.91%, to conclude late October at 5478.47. Those stocks hitting new 52-week highs towered over those slumping to new 52-week lows by a 15-to-2 margin. In stark contrast, the Dow Jones Industrial Average tumbeled 58.2 points (–1.48%) during the same period en route to a close of 3875.15.

Leading all stocks higher on a percentage-gained basis last month was Silicon Graphics, which jumped 21.6% to $30.25, after hitting a new record high of $30.38 during the period. Shares of the Mountain View-based concern rocketed after the company posted a 65% gain in third-quarter net income to $41.8 million and a 42% increase in sales for the same period to $427 million. Prudential Securities raised its 1995 earnings estimates and reiterated its "buy" recommendation following SGI's strong quarter earnings report card.

Digital Equipment, attempting to pull itself up by its bootstraps, rallied $5.25 a share during the period, or 21%, to $30.25. For the third quarter ended October 1, DEC's sales rose 4% to $3.12 billion, while its losses narrowed to $130.6 million from $154.3 million in the year-ago period.

On the sell side of the ledger, Borland fell the farthest on a percentage basis, dropping 15.2% to $10.50. Two years ago, the stock traded at a record high of $83 a share. What was Borland's transgression last month? The company disappointed shareholders when its second-quarter earnings toppled 85% to $350,000 from $2.83 million in the second quarter of 1993. Sales contracted as well, to $81.3 million from $107.4 million in the comparable year-ago period.

Lotus also had a rough-and-tumble month, as it fell $5.31 a share (–12.4%) before coming to rest at $37.50. Like Borland, Lotus disappointed its followers when it posted a third-quarter loss of $1.39 a share vis-a-vis a profit of 41 cents a share last year at this time. Merrill Lynch cut its earnings estimates for the company after the bad news hit the streets. ■

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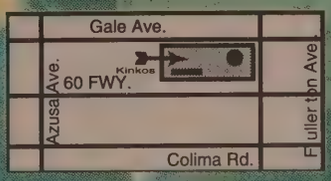

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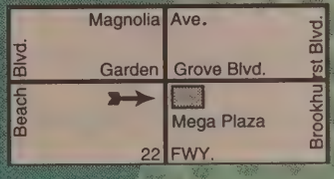

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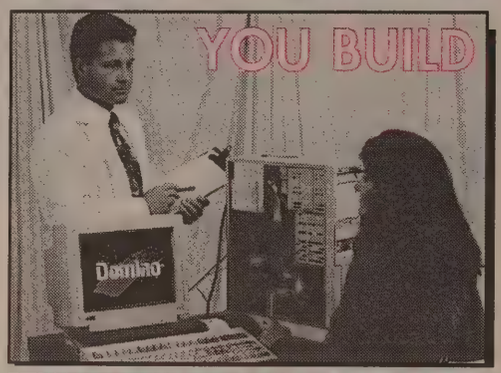

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REALIZABLE FANTASIES • BY JIM WARREN

The Death Of Freedom And Privacy In America

George Orwell's *1984*—With Its Dark Predictions Of The Future—Was Wrong. He Missed The Date By Ten Years.

They've done it!

The bastards have finally done it!

This isn't a realizable fantasy. It's a *realized* nightmare!

Last month, the myopic, naive, irresponsible, obedient sheep in Congress began the demolition of what little balance-of-power they pretended to retain over the executive branch. And they probably don't even realize what they did.

They let self-serving bureaucrats and the incumbent administration sucker them into betraying all of the innocent citizens and law-abiding businesses of this nation—in a manner that was just as much sought by the previous administration (early in 1991). The Beltway elite screwed all of us, naively thinking they were merely spending half a billion dollars for the convenience of a few bureaucrats.

They mandated that a draconian system be created for monitoring everyone in this nation—a system that will also guarantee near-omnipotent political power to all *INCUMBENT* local, state, and federal politicians and officials, at least for all who are willing to exploit their government positions for political or personal gain.

> If this law had been implemented twenty-five years ago, Nixon's staff wouldn't have needed to break into Democratic Headquarters at the Watergate.

In The Dark Of Night

This is not a drill.

In the evening of October 5, our "representatives" in the House unanimously voted to require and fund a national system for "Interception of Digital and Other Communications," passing H.R. 4922. It was fast-tracked through with minimal hearings, with public access to crucial testimony prohibited.

About 9:30 pm on October 10, our senators concurred, rushing to adjourn in time to go play or campaign for reelection. At press deadline, H.R. 4922 awaits President Clinton's signature to become law—and it was his appointees who most zealously sought this law.

Mark this on your calendars:

October, 1994, was the birth of the death of political freedom and personal privacy as we know it in Amerika. Here's how:

Keystroke Power To Wiretap Us All

H.R. 4922 requires that every public and private wired and wireless, "telecommunications [common] carrier shall ensure that its equipment, facilities, or services...are capable of—(1) expeditiously isolating and enabling the government, pursuant to a court order *or other lawful authorization*, **to intercept...all wire and electronic communications...concurrently with their transmission...; delivering intercepted communications and call-identifying information to the government**...such that they may be transmitted by [government equipment] to a location other than the premises of the carrier" (emphasis added).

This system is to give "authorized" agencies the equipment and access they need to automatically wiretap almost any electronic communication in the nation, from any equipped government site, at the stroke of a key, undetectably by citizens.

The technology to do this is already built-in to modern central-office switches, but its use has been limited to phone technicians for systems monitoring and maintenance. The phone companies have refused to connect their maintenance-monitoring circuits to external government equipment—without payment and this legal mandate.

Incidentally, the bill defines "government" as, "the government of the United States and *ANY* agency or instrumentality thereof, the District of Columbia, ...*AND* any State or political subdivision thereof authorized by law to conduct electronic surveillance" (emphasis added).

Note: The Electronic Frontier Foundation has the full text of the bill available online by ftp (ftp.eff.org, /pub/...), gopher (gopher.eff.org, 1/ ...), or WWW and Mosaic (http.eff.org/pub...) as "EFF/Policy/Digital_Telephony/digtel94.bill"—along with extensive ancillary information.

$500,000,000.00 Of Your Tax Dollars At Work

Not only will H.R. 4922 make *your* telephone "wiretap-ready," but you get to pay for it. The bill allocated funds for the first four years, to pay wired and wireless communications companies to begin implementing the system—a $500,000,000 taxpayers' down-payment to guarantee government Surveillance of the People, by the Bureaucrats, for the Incumbents.

Some communications experts have estimated that it will cost three to six *billion* dollars—just like the wild cost-overruns of so many other high-tech systems that Congress authorizes.

Even for the "paltry" half-a-billion—if a government agent is platinum-plated and costs $100,000 per year, that would pay for 1250 new agents for four years.

Geez! How many wire-taps do they want—that 1250 additional high-priced

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Realizable Fantasies *continued...*

agents couldn't do the old-fashioned way? (Admittedly, they'd have to buy some $500 ISDN butt-sets, rather than the $90 old-fashioned units that linemen use to check analog lines.)

Ratepayers Pay To Be Wiretapped?

Just in case Congress doesn't fund the rest of the system, H.R. 4922 instructs the Federal Communications Commission to establish rules that "meet the...requirements [for wiretapping] by cost-effective methods...[and] minimize the cost of such compliance on residential ratepayers." Apparently, business rate-payers may have to pick up the costs—and will pass it along to their customers in higher prices, just like all business taxes.

If tax funds run out, the communications carriers won't have to make their systems wiretap-ready, "until the equipment, facility, or service is replaced or significantly upgraded or otherwise undergoes major modification." And of course, those costs are recovered from rate-payers.

Who Has The Power? Citizens Can't Find Out!

The "*other lawful authorization*" phrase is particularly important. The bureaucratic pretense is that this system is to aid law enforcement, but "other lawful authorization" is added, throughout the bill. And us hick citizens can't find out what all those other lawful authorizations are—they're classified or secret.

What "other lawful authorizations" are there for snooping and peeping by the IRS, DEA, NSA, CIA, Defense Intelligence Agency, Secret Service, etc.?

Would any of those agencies push their secret limits? Please recall the Secret Service's 1990 Operation Sun Devil raids on never-prosecuted possible "crackers," where the SS "arrested the computers"—that was their phrase. Since computers have no constitutional protections, they were forfeited because they were not presumed innocent, and their owners couldn't afford the legal battle to prove the machines had never been used for any unauthorized purpose.

Power To Everyone Willing To Abuse It

Last summer, Internal Revenue Service officials confirmed in public Senate hearings that more than thirteen hundred IRS employees have been investigated on suspicion of making unauthorized use of their authorized access to private citizen data in IRS computers and files. In just the last five years. In just that one federal agency. Sometimes for personal curiosity; sometimes for covert sale of citizens' confidential disclosures.

Both Lyndon Johnson and Richard Nixon were known to have used the IRS to attack their political opponents.

How many thousands of federal, state, and local agencies does H.R. 4922's "government" include? How many tens of thousands of federal, state, and local staff

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Realizable Fantasies *continued...*

will have authorized access to this pervasive surveillance power? How many thousands of political appointees control those agencies—and are controlled by incumbent politicians?

How many hick sheriffs or local party bosses or nosy night staff are likely to make unauthorized use of this congressionally mandated snoop-n-peep technology against boy- and girlfriends, family members, personal enemies, business competitors, and—most dangerously—political opponents?

The bureaucratic pretense is that this system is to aid law enforcement, but "other lawful authorization" is added, throughout the bill.

Richard Nixon Would Have Used It!

If this law had been implemented twenty-five years ago, Nixon's staff wouldn't have needed to break into Democratic Headquarters at the Watergate. They could have just had later-convicted attorney general John Mitchell use his position to implement all the covert wiretaps they wanted—all over the nation—from the safety and convenience of their Beltway offices. (The bill makes the attorney general responsible for much of the system.)

The Aldridge Ames Surveillance System

Aldridge Ames is the former top-level CIA agent who sold US secrets to the Russians for years. Due to his former position—especially noting the proven lack of checks and balances within the CIA—he would very possibly have been placed in charge of this United States Wiretap System.

Using its power, Ames could certainly have made many more millions. And he could have probably wiretapped the CIA's own internal investigative staff, allowing him to escape when they first began to suspect him.

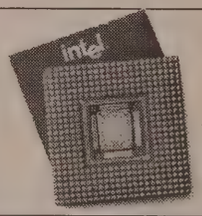
J. Edgar Hoover Would Have Loved It!

The FBI's founding director served under—and *over*—eight presidents.

For decades, the power of the FBI to conduct surveillance and wiretaps—the old-fashioned, difficult, expensive kind that required laborious field installation and constant on-site monitoring by agents—was abused and exploited, as has now been extensively documented in books and multihour PBS documentaries.

Even without this monumentally-more-powerful wiretap system that has now been forced on all of us, the FBI director exploited the Bureau's powers for decades, to enhance his personal power and the power and funding of the Bureau. The FBI's then-limited surveillance powers were used to build dossiers for blackmailing the nation's most-powerful politicians. (Ahah! Maybe *that's* how H.R. 4922 was rammed through!)

intel inside



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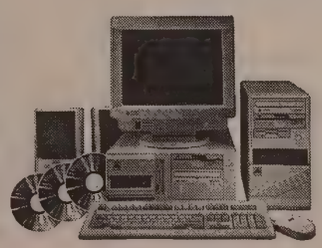

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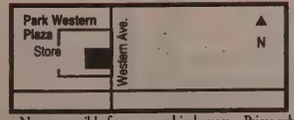

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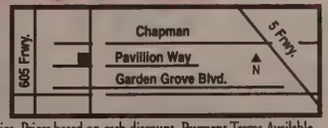

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Realizable Fantasies *continued...*

No political leader—then or now—dared challenge the FBI. All feared the Bureau's massive files on themselves and on their political allies, often compiled using unauthorized wiretaps. E.g., when Attorney General Robert Kennedy authorized three wiretaps on Martin Luther King, Jr., the FBI promptly installed at least fourteen taps. When President Lyndon Johnson prohibited wiretaps except for national security, the FBI continued tapping King—no mere president was going to stop the FBI.

When Hoover died in 1972, his personal aides destroyed thirty-five file *cabinets* of his personal dossiers—presumably including drawers of secrets used to control powerful politicians and national leaders. Even so, Freedom-of-Information researchers later uncovered thousands of pages of embarrassing records on everyone from Dwight Eisenhower and Lyndon Johnson to John F. Kennedy and Martin Luther King, Jr.

Further abusing their surveillance ability, the FBI compiled embarrassing dossiers on a huge array of Hollywood leaders, including Bing Crosby, John Wayne, Cary Grant, Henry and Jane Fonda, Desi Arnaz, and of course, Marilyn Monroe. They compiled more than six hundred pages on Elvis Presley alone. And while those files existed, Hollywood films were never critical of the FBI.

If Hoover had access to this system, the FBI would probably have had to destroy an entire building—*full* of file cabinets.

Why Hasn't The Press Howled?

Interestingly, I don't recall reports that the FBI compiled dossiers on leading newspaper publishers, editors, nor leading members of the press. Given the massive power of "the fourth estate," that's rather surprising.

It has been frustrating and infuriating, however, that the mainstream print and broadcast press have given virtually no coverage to this bill—especially given its Orwellian implications for the nation. And the computer trade-press hasn't done much better.

More than likely, most of the press was just too technically naive to understand the realistic ramifications, much less figure out how to explain the issues in a manner that could compete with *important* stories about Tonya Harding and O.J. Simpson.

Not Much Hope

Once they fully realize the political power of what they have created, it is unlikely that the incumbent majority party in Congress will dare to challenge the bureaucrats who could, by then, be monitoring their every communication—much less vote to cancel this Aldridge Ames Memorial Peeping Program. And even if they tried, the president who controls it would surely veto any attempt to degrade his or her powers.

Perhaps our only hope is that government agencies or Beltway contractors will try to implement significant parts of the system, directly—resulting in technology debacles similar to the failed air traffic control system, the failed IRS automation system, and the failed Department of Defense acquisitions payment system. Unfortunately however,

Continued on page 225

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InterLan Micromau AUI to RJ-45	49.00

SONIC SYSTEMS

Sonic Systems AUI to BNC & RJ-45	85.00
Sonic Systems AUI -2x to RJ-45	105.00
Sonic Systems AUI -2x to BNC	105.00

REMOTE COMMUNICATIONS

GATEWAY

4 Port LAN Expander	1,295.00
LAN Access Server, 4 MB	1,459.00
LAN Access Server, 8 MB	1,619.00

SHIVA

LanRover 4/E- 4 Lines (BNC/AUI/10 BT)	2,569.00
LanRover 4/T-Token Ring	3,369.00
LanRover 8/E- 8 Lines (BNC/AUI/10 BT)	3,669.00
NetModem / E Commserv, BNC	1,529.00

U.S. ROBOTICS

LAN Modem 14.4.	1,295.00
LAN Modem Token Ring 14.4	1,729.00
Communication Server 386	1,519.00
Shared Access Modem 14.4	539.00

TELEBIT

Telebit ACS 8 Port Gateway Dial In/Out	2,839.00

NETWORK HUBS

3COM

LinkBuilder TP/ 12 Port Hub	379.00
LinkBuilder 12 Port Hub (3C621)	759.00
LinkBuilder FMS II 12 Port	649.00
LinkBuilder FMS II 12 Port Mgmt	995.00
LinkBuilder MSH 10BT Hub(3C18000)	2,499.00

ADDTRON

4 Port Arcnet Passive Hub	15.00
8 Port Arcnet Coax Active Hub	125.00
8 Port Arcnet Twisted Pair Active Hub	135.00
8 Port Ethernet 10 Base-T Hub	159.00
16 Port Ethernet 10 Base-T Hub	299.00

ALLIED TELESIS

4 Port Ethernet 10 Base T Hub [MR410T]	379.00
8 Port Ethernet 10 Base T Hub [MR810T]	429.00
12 Port Ethernet 10 Base T Hub w/SNMP [3612TR]	899.00

D - LINK

D-Link 9 Port Hub	195.00
D-Link 12 + 2 Hub	420.00
D-Link 12 Port SNMP Hub	839.00
D-Link 12 Port SNMP Intelligent Hub	895.00
D-Link 4 Port Hub/Adapter	295.00

HEWLETT PACKARD

AdvancedStack 12 2600a	769.00
AdvancedStack 24 2601a	1,195.00
8 Port EtherTwist	359.00

SMC

8 Port Elite 3608 Concentrator	329.00
12 Port Elite 3512 Concentrator	599.00
12 Port Elite 3612 TP Active Hub	699.00

SYNOPTICS

16 Port 2800 Hub(16 RJ45/ 1 AUI)	639.00
16 Port 2804 Hub(16 RJ45/1 FOIRL)	959.00
OTHER MODELS	CALL!!

NETWORK REPEATERS

ADDTRON

2 Port Coax /Thick Repeater	359.00
4 Port Coax /Thick Repeater	499.00
5 Port(2 BNC/2 RJ-45/1 AUI) Repeater	299.00

ALLIED TELESIS

Fiber to BNC Repeater	599.00
4 Port Coax Repeater(4 BNC & 1 AUI)	1299.00

C-NET

Repeater-2 BNC, 1 AUI	449.00
Repeater-2 BNC, AUI, & Fiber Optic	719.00

IMC NETWORKS

BNC to BNC Repeater [52-10242]	323.00
BNC to RJ-45 Repeater	369.00
BNC to AUI Repeater	499.00

TUT

Systems Repeater - 4 BNC / 1 AUI	390.00

TAPE BACKUP DRIVES

CHEYENNE SOFTWARES

ARC Serve 1 User	159.00
ARC Serve 5 Users	269.00
WINDOWS 5 Users	269.00
WINDOWS 250 Users	1,589.00

COLORADO MEMORY SYSTEMS

DJ-20 250 MB Internal	179.00
Powertape 2GB Internal	955.00
Powertape 2GB External	1,279.00
Powertape 4GB Internal	1,299.00
Powertape 4GB External	1,599.00
Powertape NLM 5 Users	319.00
Powertape NLM 20 Users	669.00
Power DAT 6000 4GB Internal	1,295.00
Power DAT 6000 4GB External	1,595.00

CONNER

Python 2GB Internal DAT Drive Only	699.00
Python 2GB External DAT Drive Only	1,099.00
Python Turbo 4-8GB Internal DAT Only	1,099.00
Python Turbo 4-8GB External DAT Only	1,199.00
Tapestor DAT Internal 2GB & NLM	1,161.00
Tapestor DC6000, 1.3 GB Kit	1,027.00
Arcada BackUp Software for Novel Server	269.00
Arcada BackUp Software for Windows NT Server	559.00

EXABYTE

FS1G 1.5GB Tape Internal	795.00
FS1G 1.5GB Tape External	949.00
8200 5GB Internal	1,995.00
8200 5GB External	2,295.00
8500 10GB Internal	2,795.00
Autochanger 48GB Tape External	5,595.00

FILE SERVER HARD DRIVE

MICROPOLIS - FAST SCSI II

(!! BEST BUY !! 5Yrs Manufacture Warranty)

1.05 GB [4410] SCSI-II 8.5ms	849.00
2.0 GB [4221] FAST SCSI-II 9ms	1,599.00
2.05 GB [4421] FAST SCSI-II	1,899.00
3.6 GB [1936] SCSI-II 11.5 ms	1,999.00
4.29 GB [3243] FAST SCS-II 9ms	2,559.00
9.09 GB [1991] FAST SCSI-II	3,999.00

CONNER

1.06 GB [1060S] SCSI-II 10 ms	659.00

Seagate - FAST SCSI II

1.60 GB [ST11950] FAST SCSI-II 9ms	1,299.00
2.15 GB [ST32550] FAST SCSI-II 9ms	1,599.00
4.10 GB [ST15150] FAST SCSI-II 9ms	2,899.00
9.0 GB [ST410800] FAST SCSI-II 11.5ms	3,749.00

NETWORK ROUTERS

3COM

NetBuilder Remote Office	1,789.00

CAYMAN SYSTEMS

GaytorStar IHR 10 Base-T Router	3,949.00

COMPATIBLE SYSTEMS

RISA Router 3000E Router	2,299.00

DIGITAL EQUIPMENT CORP.

BRouter 90Ti Router	2,499.00

D-LINK

Ethernet High Speed Bridge	2,639.00

HEWLETT PACKARD

Ethernet Router s/SNMP	5,539.00

NETWARE RAIDION SYSTEM

MICROPOLIS

Microdisk AV 1050 1.05GB External	1,349.00
Microdisk AV 1760 1.76GB Ext.w/Software	1,629.00
Microdisk AV 3020 3.02GB External	2,899.00
Microdisk LS 2100 2.1GB Ext.w/Software	2,159.00
Microdisk LS 3020 3.02GB External	2,799.00
Microdisk LT 1050 1.05GB External	1,269.00
Microdisk LT 1760 1.69GB External	1,549.00
Raidion 4200 3-2.1GB External SCSI-II	6,799.00
Raidion 6040 3-3.2GB External SCSI-II	11,659.00

NETWORK UTILITIES

CENTRAL POINT Antivirus NLM	899.00
CHEYENNE InnocuLan NLM 20 Users	329.00
CHEYENNE Utilities for NetWare	269.00
FRYE NetWare Manager 1 Server	349.00
FRYE Early Warning System	349.00
HORIZONS Lan Auditor 50 Users v3.0	329.00
HORIZONS Lan Shadow v4.0	669.00
INTEL LanDesk Virus Protection	739.00
INTEL LanDesk Manager	899.00
SABER Lan Workstation	129.00
XTREE Xtree Tools for NetWare	549.00

NETWARE CONNECT

NOVELL

NetWare for SAA 16 session	1,479.00
NetWare for SAA 62 session	4,419.00
NetWare HostPrint 16 sessions	879.00
NetWare HostPrint 128 sessions	2,195.00
Novell NetWare Connect 2 port	439.00
Novell NetWare Connect 8 port	1,595.00
Novell NetWare Connect 32 port	4,395.00
NetWare Multi Protocol Router	729.00
NetWare Multi Protocol Router Plus	1,099.00
NetWare for Macintosh v3.12 200 User	729.00
NetWare for Macintosh v4.0 Unlimited	879.00

NOTEBOOK ETHERNETS

For Parallel Port (Pocket Ethernet) Only	
Addtron Pocket Ethernet	159.00
Xircom Pocket Ethernet III	289.00
Xircom Pocket Ethernet III Combo	319.00
For Credit Card Type (PCMCIA) Only	
3Com Etherlink III 10 Base-T	259.00
3Com Etherlink III Combo	309.00
Xircom Credit Card	239.00
Xircom Credit Card Combo	269.00

NETWORK FAX SERVER

CHEYENNE SOFTWARE

FAXServer v2.0 NLM 10 Users	339.00
FAXServer v2.0 NLM 25 Users	469.00
FAXServer v2.0 NLM 50 Users	599.00

NETWORK PRINT SERVER

BELKIN

Belkin Ethernet 3+3 Print Server	461.00

CASTELLE

LANpress Extra 1P 1S BNC & RJ-45	399.00
LANpress Extra 2P 2S BNC & RJ-45	479.00
JetPress MIO-Extra BNC & RJ-45	439.00
JetPress XIO-Extra BNC & RJ-45	399.00

DAYNA

EtherPRINT 4 Device & AUI BNC/RJ-45	475.00

DIGITAL PRODUCTS

NETprint 50 1 Parallel, RJ-45	379.00
NETprint 150 3P 1SP Combo	695.00

EAGLE

Eagle NPE400 Ethernet Combo	369.00

EMULEX

NETQ Novell, Apple, TCP/IP & DEC	595.00

HEWLETT PACKARD

HP Jet Direct TP/BNC	437.00

INTEL

Intel NetPort II Ethernet	417.00
Intel NetPort Express XL Ethernet Combo	479.00

LANTRONIX

EPS1 Multiprotocol	529.00

LEXMARK

4033 Printer Connect BNC or RJ-45	499.00

PRINTMATE

PrintMate 2P 1S BNC RJ-45	399.00

PACIFIC DATA

Directnet HP 3/ Novell	359.00
Directnet HP 3/ Multiprotocol	549.00
Directnet HP 4/ Novell	359.00
Directnet HP 4/ Multiprotocol	549.00

XIRCOM

Pocket Ethernet Print Server	294.00
Ethernet Print Server-1P BNC or RJ-45	299.00

SCSI-II CONTROLLERS

ADAPTEC

AHA-1522AK Adapter w/ Kit	139.00
AHA-1542CFK Adapter w/ Kit	259.00
AHA-1640 MCA Adapter w/ Kit	359.00
AHA-2842C VL-BUS Adapter w/ Kit	259.00
AHA-2742T EISA Adapter w/ Kit	379.00
AHA-2940 PCI Adapter w/ Kit	299.00

NETWORK MANAGEMENT

NOVELL

LANalyzer for MS Window v2.1	1,095.00
LANalyzer Agent 1-segment	1,095.00
LANalyzer Agent Multi-segment	1,839.00
NetWare Management System v2.0	1,839.00

DIGIBOARD

2 Port for Windows	195.00
PC/4E w/ Conn	459.00
PC/8E w/ Conn	595.00
PC/16EM System	995.00
EISA C/16 w/ Conn	1,449.00
ISA EPC/16 16 Port Multiport w/ Conn	1,895.00

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AMERICAN POWER CONVERSION

Back UPS System 600	299.00
Back UPS System 900	415.00
Smart UPS System 600	409.00
Power Chute Plus Software for NLM	69.00

TRIPP-LITE

BC-600 UPS System Lan	269.00
BC-900 UPS System Lan	389.00
Omni 600 UPS System Lan	359.00
Power Alert Software for NLM	65.00

NETWORK CABLES/TOOLS

Cables	
25 Feet RG58A/U Coaxial Cable	8.00
25 Feet RG62 Coaxial Cable	12.00
25 Feet 10 Base-T Twisted Pair (Level 4)	8.00
Connectors	
50 Ohm BNC Terminator (Thin Ethernet)	2.00
93 Ohm BNC Terminator (Arcnet)	2.00
T-Connector	2.00
RJ-45 Connector	.89
Tools	
BNC Crimping Tool	25.00
RJ-45 / RJ-11 Crimping Tool	29.00
RJ-45 Crimping Tool	19.00
RG-58 / 62 Wire Stripper	25.00

LOCAL / WIDE AREA BUSINESS NETWORK SOLUTIONS

We specialize in the following areas:

1. *Complete Novell NetWare Installation*
2. *Network Cable Installation*
3. *On-Site Service & Training*
4. *Network Maintenance Contracts*
5. *CNEs to serve your needs*

NOVELL — 3Com — TRIPP LITE — ARTISOFT

BSI FILE SERVERS

PENTIUM-90 Mhz	$1,969.00
PENTIUM-66 Mhz	$1,949.00
PENTIUM-60 Mhz	$1,929.00
486DX2-66 Mhz	$1,259.00

* Motherboard w/ 256K Cache
* 8MB of Memory, 70ns
* Monochrome Card
* 14" Monochrome File Server Monitor
* Super IDE & I/O Card (2S,1P,1G)
* 540MB IDE Hard Drive
* 1 44MB Teac Floppy Drive
* Mini-Tower File Server Case w/ UL Power Supply
* 101-Enhanced Keyboard
* 16 bit Novell Certified Network Card

BSI WORKSTATIONs

486DX2-66 Mhz	$699.00
486DX-33 Mhz	$657.00
486SX-33 Mhz	$599.00
386SX-40 Mhz	$429.00

* Motherboard w/ Cpu
* 2MB of Memory, 70ns
* Monochrome Card
* 14" Monochrome Monitor
* 101-Enhanced Keyboard
* Mini-Tower Workstation Case w/Power Supply
* 1 44MB Teac Floppy Drive
* 16 bit Novell Certified Network Card

BSI SUPER SYSTEMS

486DX2-66 Mhz	$1,249.00
486DX-50 Mhz	$1,259.00
486DX-33 Mhz	$1,229.00
486SX-33 Mhz	$1,189.00

* VL-BUS Motherboard w/ 256K Cache
* 4MB of Memory, 70ns
* Super VGA Card w/ 1MB
* 14" Super VGA Monitor, 28mm
* Super I/O Card (2S,1P,1G)
* 540MB IDE Hard Drive
* 1 44MB Teac Floppy Drive
* Microsoft Compatible Mouse w/ Pad
* Mini-Tower Case w/ 200 Watts Power Supply
* 101-Enhanced Keyboard

PENTIUM SYSTEMS

PCI PENTIUM-90 Mhz	$2,299.00
PCI PENTIUM-66 Mhz	$2,249.00
PCI PENTIUM-60 MHz	$2,229.00

* Pentium Motherboard w/ 256K Cache
* 8MB of Memory, 70ns
* Diamond SpeedStar Pro SE PCI SVGA Card
* 14" Super VGA Monitor, 28mm
* PCI IDE & I/O Card (2S,1P,1G)
* 540MB IDE Hard Drive
* 1 44MB Teac Floppy Drive
* Microsoft Compatible Mouse w/ Pad
* 101 Enhanced Keyboard
* Mini-Tower Case w/200 Watts Power Supply

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" Peer to Peer Networking "

Complete package to connect 2 computers.

Includes: 2 Network Operating Softwares
2 16-bit Ethernet Cards
FREE 25 ft Coax Cable & Terminators

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Lantastic 6.0 (Dos & Windows)	239.00
MICROSOFT:	
Windows for Workgroup 3.11 Full Version	379.00
Window for Workgroup 3.11 Add-On	189.00
NOVELL:	
Personal NetWare 1.0 (Dos & Windows)	239.00
NetWare Lite 1.1	189.00

*All prices are subject to Change without prior notice

!!! Government, School & Corporate P.O.s are WELCOME !!!

WE CONFIGURE

Pentium 90MHz

Intel Pentium 90MHz CPU
Reliable Pentium M.B. w/256K Cache
8MB RAM Upgradable to 64MB
420MB IDE Hard Drive w/256K Cache
Teac 1.2MB & 1.44MB Floppy Drive
14" SVGA .28 NI Monitor (1024x768)
PCI Windows Acc. 1MB Video Card
SVGA 16M Color
101 Enhanced Keyboard
Mid-Tower Case

Reg. $2095 Cash **$1995**

All systems include a mouse!

IBM 486-75MHz CoBalt

Recommended for Windows Application from ATC Computer

PC Computing rates IBM as slightly faster than Intel 486dx2-66
Lightning fast in Microsoft WINDOWS application
IBM 486CoBalt 75MHz CPU
IBM's 3 Year Warranty on M.B.
4MB RAM Upgradable to 64MB
420MB IDE Hard Drive w/256K Cache
Teac 1.2MB & 1.44MB Floppy
14" SVGA .28NI Monitor (1024x768)
VESA Windows Acc. 1MB Video Card SVGA 16M Color
101 Enhanced Keyboard
Mini Tower Case

Reg. $1095 Cash **$995**

This Month's SPECIAL

486dx2-66MHz VESA
8MB RAM, 256K Cache
420MB IDE Hard Drive
Teac 1.2 & 1.44 F. Drive
15" Impression 5.28 (1280x1024)
VL-Bus Windows Acc. w/1MB
VL-Bus IDE I/O
101 Enh. Keyboard
Mini-Tower Case

Reg. $1345 Cash **$1245**

100MHz 486 V-LB

Intel 486dx4-100 CPU w/16k int. cache
Vesa Local Bus Mother Board
4MB RAM Upgradable to 128MB w/256k Ext. Cache
420MB IDE Hard Drive
Teac 1.2MB & 1.44MB Floppy Drive
14" SVGA Non-Int. .28 Monitor (1024x768)
VLB Windows Accer. Video Card w/1MB
VLB IDE I/O Card
101 Enh. Keyboard
Mini-Tower Case

Reg. $1495 Cash **$1395**

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YOUR WAY

CALL FOR THE BEST PRICE, BEST DEAL, BEST SERVICE

ATC 486 SYSTEMS

System Includes

Intel 486 CPU, 4MB RAM, 256K Cache
420MB Fast IDE Hard Drive
Teac 1.2MB, 5.25" Floppy Drive
Teac 1.44Mb, 3.5" Floppy Drive
14" Super VGA Monitor,
.28 DPI Non-Interlaced (1024x768)
32 Bit VESA Windows
Accelerated 1MB
Super VGA Adaper, 1.6M Colors,
101 Enhanced Keyboard
Mini-Tower Case

	Vesa Bus		PCI Bus	
	Reg.	Cash	Reg.	Cash
486sx-33MHz	$995	$945	$1195	$1095
486dx-33MHz	$1145	$1045	$1295	$1195
486dx2-66Mhz	$1195	$1095	$1345	$1245

Upgrades

PER 4MB UPGRADE	$145
15" SVGA MON. .28 NI 1280X1024	$135
17"SVGA Monitor .26 NI 1280x1024	$430
420MB to 540MB	$95
420MB to 1Gig	$425
96/24 Internal Fax/Modem	$39
14.4 Internal Fax/Modem	$69
19.2 Internal Fax/Modem	$125
28.8 Internal Fax/Modem	$175
S.B. Comp. 16 Bit Sound Card	$55
Ethernet Network Card 10T/Coax	$45
Desktop Case	$10
Mid-Tower (Small)	$25
Mid-Tower (Full)	$35
Full-Tower	$55
HP Deskjet 520 Printer	$295
HP Deskjet 560C Color Printer	$545
HP Laserjet 4L Printer	$625
HP Laserjet 4 Printer	$1195

WE CONFIGURE YOUR WAY

Sound Blaster Discovery CD 16

Sound Blaster 16
Panasonic 2x speed CD-ROM Drive
Pair of Boosted Speakers
15 Title Software
Microphone
Unlimited Tech. support, 7 days a week

Reg. $295 Cash $275

Life Time Labor Warranty
1 Year Parts Warranty

Free access to BBS (310) 869-1337

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System Includes

4MB RAM, 128K Cache
210MB Fast IDE Hard Drive
Teac 1.2MB, 5.25" Floppy Drive
Teac 1.44MB, 3.5" Floppy Drive
14" Super VGA Monitor (1024x768)
Trident Super VGA Display Adapter
Spill Resistant 101 Enhanced Keyboard
Mini Tower Case

	Reg.	Cash
386sx 40MHz w/2MB	$745	$695
386dx 40MHz	$845	$795
486sx 40MHz	$1145	$1095

ATC COMPUTER

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(213) 938-6622

HOLLYWOOD NEW
6301 Sunset Blvd. #106
(213) 962-8610

ORANGE NEW
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(714)744-5156

TORRANCE
15800 Hawthorne Blvd. #D
(310)370-2655

VAN NUYS
6411 Sepulveda Blvd. #1J
(818)988-9806

Help Us Choose The Next MicroTimes 100!

In keeping with our time-honored tradition, our January issue will feature our annual list of leaders and unsung heroes who played a key role in the personal computer industry in 1994.

We already know about most of the usual headline-grabbers, of course, and many companies have hard-working PR departments that keep us informed about their achievements. The people we really want to know about, and feature, are the ones you, the readers, think are important.

So tell us who you think had the most significant impact on the computer industry in 1994. They can be Rich and Famous like Bill Gates; they can be low-profile like your neighbor who teaches computer skills to local youth. They can build fast chips, community networks, or virtual dinosaurs.

Tell us *why* you think we should put them on the list, what particular accomplishment makes them noteworthy. And please tell us where and how we can contact your nominee for more information.

We will give ten free one-year subscriptions to *MicroTimes* to randomly drawn respondents to this survey, so if you'd like to enter the drawing, please be sure to include your name and address at the end of this form.

In order to be considered, your nomination must be received in our Pleasant Hill office by 9 am on Wednesday, November 30. Nominations may be sent by US Mail, fax, or electronic mail.

Thanks for your help!

—eds.

Name of your nominee: _____

Company affiliation: _____

Contact information (address, phone):

_____

_____

Why should this person be on the list for 1994?

_____

_____

_____

Your name, address, and phone number (optional—required for drawing):

_____

_____

_____

_____

Send your nominations to:

MicroTimes 100 1994
3470 Buskirk Avenue
Pleasant Hill, CA 94523
Fax: (510)934-3958

Electronic mail:

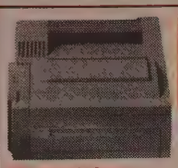
The WELL: microx
Internet: microx@well.sf.ca.us
MCI: MicroTimes
America Online: MicroTimes

MICROTIMES 100 BALLOT

Nominations must be received by 9 am, Wednesday, November 30, 1994.

COMPUTER City SUPERCENTER

PRINTERS AND ACCESSORIES



$527.87

HEWLETT PACKARD

HP LaserJet 4L Printer #36-10440

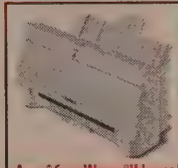
- 300 dpi resolution
- 4ppm printing
- 1MB upgradable to 2MB
- 26 scalable typefaces
- 100-sheet paper tray
- EconoMode printing cuts toner usage in half
- Memory Enhancement Technology

$529.75

EPSON

Stylus Color InkJet Printer #97-10060

- 360 dpi printing
- 720 dpi w/coated paper
- Prints up to 16.7 million colors
- Separate black and color ink cartridges
- 100-sheet paper capacity
- Seven fonts (4 scalable)
- Windows drivers
- Two-year warranty

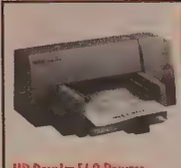


$255

Authorized Reseller

Apple® StyleWriter® II Inkjet Printer #98-10001

- 360 dpi resolution
- Up to 2 ppm
- 39 scalable fonts
- Holds up to 100 sheets of paper
- Handles letter, legal, envelopes and transparencies
- Compact design fits easily on desks



$288.46

HEWLETT PACKARD

HP DeskJet 540 Printer #97-10073

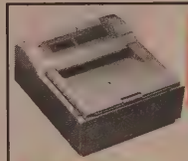
- 600x300 dpi with HP's Resolution Enhancement
- Color Printing with Optional Kit
- Up to 3ppm
- Eight built-in DOS & 14 TrueType Windows fonts
- Prints on Postcard to Legal sized paper
- Three-year warranty

$925.95

HEWLETT PACKARD

HP LaserJet 4P Printer #36-10448

- 600 dpi resolution
- 4ppm printing
- Enhanced HP PCL-5
- 2MB upgradable to 26MB
- 45 scalable typefaces
- 250 sheet paper tray
- EPA Energy Star compliant
- Custom Media Handling

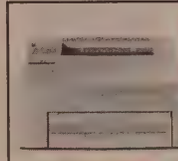


$410.97

OKIDATA

OL-400e Laser Printer #36-10447

- 300 dpi resolution
- 4ppm printing
- 512KB upgradable to 4.5MB RAM
- 100-sheet paper capacity
- 44 fonts
- One-year parts and labor warranty
- Five-year printhead warranty



$899

Authorized Reseller

Apple® LaserWriter® 320 #36-10455

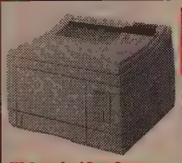
- 300 dpi resolution
- 4ppm printing
- 2MB upgradable to 8MB
- Adobe PostScript Level 2
- 100-sheet paper tray
- 39 fonts
- Energy Star Compliant

$369.51

HEWLETT PACKARD

HP DeskJet 320 Printer #97-10074

- 600x300 with HP's Resolution Enhancement technology
- Color with optional snap-in cartridge
- Prints 3ppm
- Lightweight and compact
- One-year Warranty

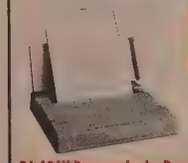


$1469.65

HEWLETT PACKARD

HP LaserJet 4Plus Printer #36-10461

- 600 dpi resolution
- Fast 12ppm printing
- Standard 350 sheet capacity max. 850 sheets
- 45 scalable typefaces
- 2MB upgradable to 66MB
- Enhanced HP PCL-5
- Optional duplex printing
- Resolution Enhancement Technology



$239.55

Canon

BJ-10SX Portable InkJet Printer #97-10055

- 360 dpi resolution
- 110cps printing
- Single sheet paper-handling with optional 50 sheet paper feeder
- Meets EPA energy conservation guidelines
- Two-year limited warranty

$499.76

Authorized Reseller

Apple® Color StyleWriter® 2400 #97-10079

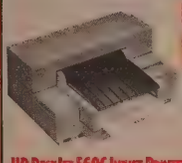
- 360 x 360 dpi
- 3ppm B&W printing
- Compact desktop design
- 64 scalable TrueType® and PostScript fonts
- Brilliant color outputs
- One-year warranty

$399.75

Panasonic

Panasonic KX-P4400 #36-10477

- 300 dpi resolution
- Prints 4ppm
- 512K upgradeable to 4.5MB
- 28 fonts
- Compact design
- One-year limited warranty



$489.55

HEWLETT PACKARD

HP DeskJet 560C Inkjet Printer #97-10053

- 600x300 dpi resolution
- Up to 3ppm printing
- Prints up to 16.7 million colors
- 14 scalable typefaces
- 6 bit mapped fonts
- 100-sheet paper capacity
- Built-in ColorSmart technology
- Three-year warranty

$229.95

Canon

BJ-200e InkJet Printer #97-10049

- 360 dpi resolution
- 4ppm printing
- Quiet 42 decibel printing
- 100-sheet paper capacity
- Manual feed
- 20 TrueType® fonts
- 15 envelopes in sheet feeder
- Two-year limited warranty

$399.96

Canon

BJC-4000 #97-10063

- 360x360 dpi color
- 720x720 dpi B&W
- 16.7 million colors
- Two-year limited warranty
- Prints on plain and coated paper, transparencies and back print film
- Up to 5ppm printing

$296.46

HEWLETT PACKARD

HP DeskWriter 540 Printer #97-10075

- 600x300dpi with HP's Resolution Enhancement
- Color with optional kit
- Up to 3ppm printing
- 35 TrueType® fonts
- Prints on postcard to legal paper
- Macintosh® compatible
- Three-year warranty

Dot Matrix Printers

Epson LX-300 Color #98-10009 ..... $165.77

Okidata ML-320 #98-10007 ..... $283.99

Inkjet Printers

Hewlett-Packard DeskWriter 320 #97-10076 ..... $369.55

Hewlett-Packard DeskWriter 560C #97-10052 ..... $459.95

Hewlett-Packard DeskJet 1200C #97-10005 ..... $1319.95

Hewlett-Packard DeskJet 1200CPS #97-10008 ..... $1999.74

Laser Printers

Apple® StyleWriter® Portable #97-10006 ..... $375

NEC SilentWriter 610 #36-10457 ..... $399.75

Apple® LaserWriter® Select 300 #36-10437 ..... $549.55

Okidata OL-410E #36-10454 ..... $679.86

NEC SilentWriter 640-Mac #36-10456 ..... $719.55

Okidata OL-410E/PS #36-10465 ..... $899.75

Hewlett-Packard LaserJet 4ML #36-10446 ..... $989.85

Printers Accessories

Butler Premium Copy Paper 500 sheets #34-10847 ..... $3.23

Allsop CD-ROM Caddy #40-10445 ..... $8.23

Apple® StyleWriter® II Ink Cartridge #34-10876 ..... $19.13

Epson 720 dpi Paper for Stylus #34-11027 ..... $19.99

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Links Pro Macintosh provides a great game of golf at the Harbour Town Golf Links. It features nine viewing windows, statistics and texturing.

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This **Windows for WorkGroups Add-On** will give your Windows 3.1 application the boost it's been needing.

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Lotus 1-2-3 5.0 Upgrade for Windows is the simple way to create spreadsheets. It increases productivity by combining simplicity, usability and power!

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The **Print Shop Deluxe CD Ensemble** features the most popular Print Shop Deluxe programs on one CD! They include everything you need to create great-looking printed pieces.

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Out of the Sun for Power Mac is the first real interactive fighter simulation! It combines advanced graphics and sound with realistic and entertaining action. Fly the skies over major battles in history.

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Easy Database Management! #58-10170

Access 2.0 Upgrade for Windows is the quick and easy way to manage databases! Publish professional-looking reports, create your own forms and link directly to data from multiple sources!

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Microsoft

Excel 5.0 Upgrade For Power Mac® #74-10153

Microsoft Excel 5.0 Upgrade for Power Mac automates and simplifies routine tasks, while drag and drop editing makes cross-application use easy.

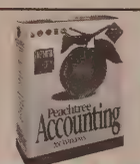
$89.96

WordPerfect

Novell Applications Group

A Must For Every Student! #78-10347

Student Essentials Pack for Mac is a complete collection of Macintosh software that will make any student's schoolwork easier!



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Accounting Never Been Easier! #52-10197

Peachtree Accounting 3.0 for Windows provides everything you need to run your small business — from general ledger features to custom forms design.

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Visio is the perfect program for business graphics! More than 750 SmartShapes and over 20 job-specific stencils help create professional-looking drawings and diagrams — and you never have to draw a thing!

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Novell Applications Group

Create Professional-Looking Documents! #78-10356

WordPerfect 6.1 Upgrade for Windows combines powerful word processing, drawing, charting, spreadsheet functionality within tables, and direct integration features in one!

Meca - TaxCut
Headstart For Windows #75-10216 ..... $9.74

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Power Rangers CD-ROM #60-12725 ..... $24.87

CompuServe - Membership Kit
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VidGrid CD-ROM #60-12764 ..... $24.97

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Ventana Media Internet membership
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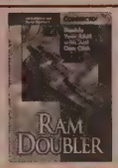
Expert Forms for Windows, includes 50 pre-designed sample forms and powerful design tools for both your personal and business needs.



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CONNECTIX

Double Your Mac's RAM! #76-11354

RAM Doubler for Macintosh and Power Macintosh doubles your system's memory with the click of the mouse. It's fast and easy to use, plus it works with a range of Mac software.

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PFS: Business Plan, for Windows, is an integrated program designed to make your business plan easy to write and impressive to read. It features a word processor, spreadsheet and charting functions.

$75.54

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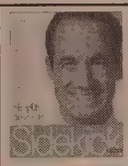
Now Utilities 5.0 for Macintosh features nine high-powered components to make your Mac easier to use. Stop software conflicts, find multiple files and folders, save disk space and more. The ultimate utility package!

$24.04

PARSONS TECHNOLOGY

It's Legal is Your Legal Solution! #71-10480

It's Legal 5.0 for Windows lets you prepare your own legally binding documents. You get 53 customized personal and business documents. Easy-to-use icons put the law at your fingertips!



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Sidekick for Windows #73-10379

Sidekick is the all-in-one personal organizer that's fast, functional and friendly. It helps you stay on top of everything you've got going.

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Insignia Solutions™

Read And Write Macintosh® Files On Your PC #76-11288

MacDisk, for PC, provides instant access to any Mac® file using your favorite PC applications. This utility lets you read, write, and format high-density Mac® disks.

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Powerful File Transfer Made Easy! #76-11007

Laplink V is the smartest, easiest-to-use and most powerful file transfer solution available. Whether you're using DOS or Windows, you'll be up and running and transferring files and directories in minutes.

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MicroHelp, Inc.

Five Popular Programs In One Great Package! #76-11327

Microhelp Home and Office Value Pack expands your home office capabilities with programs like UnInstaller, 1st ACT, Emergency Disk, FaxWorks and Managing your Money.

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Directory Assistance On A Disc! #71-10511

Select Phone is a complete listing of over 80 million residential and business phone numbers and addresses across the United States! And it's all on one CD-ROM for Windows, Mac or DOS!

$32.99

SPINNAKER

Calendar Creator Plus

Calendar Creator For Windows! #73-10370

Calendar Creator Plus Version 2, for Windows, produces a variety of calendars ranging in size and style. Choose from multiple calendar formats, print pictures, highlight events and more!

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Double Your Disk Capacity! #76-11229

Stacker, for Macintosh, doubles disk capacity by using LZS™ compression technology. It's compatible with all applications, features foolproof installation and supports all hard disks.

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Norton Utilities 8.0 is the latest and most popular way to safely recover lost data, repair disk problems and retrieve lost or erased files.

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SYMANTEC.

Top-Rated Contact Management Software! #71-10429

Act! Version 2.0, for Windows, is an easy way to manage business relationships. Print out the calls you need to make, meetings to attend and work to complete!

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Calendar for Windows #73-10372 ..... $19.74
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PRCO
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WizardWorks
Business Cards for Win. #71-10505 ..... $26.74
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Berkley Systems - Expresso
For Mac/Windows Win#76-11321/Mac76-11320 $46.42
Laser Tools
Print Cache 3.12 #76-11221 ..... $49.84
Stac Electronics
Stacker Upgrade #76-11268 ..... $49.96
Broderbund
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Conflict Catcher II #76-11162 ..... $54.84
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For Windows #71-10449 ..... $59.84
Helix Technologies
Net Room 3.0 #76-11191 ..... $69.94

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Direct Phone CD #71-10512 ..... $74.95
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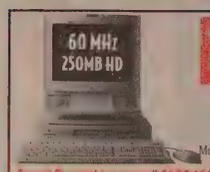

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Authorized Reseller

Monitor, CD and Keyboard Sold Separately

Apple® Power Macintosh® 6100/60 #12-10464

- PowerPC™ 601 RISC microprocessor
- 60MHz
- 8MB RAM
- 250MB hard drive
- Two stereo ports
- Eight built-in ports
- 32K cache
- Built-in floating-point math coprocessor

$1496.16

COMPAQ

Compaq Presario 720 CDS #12-10451

- 486SX2/66 processor
- 4MB RAM
- 420MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS-Works, Encarta, Windows and more!

Monitor sold separately

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Monitor Sold Separately

Force 51 CD #12-10428

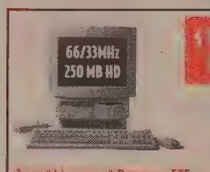
- Intel™486SX2/50 processor
- 4MB RAM
- 340MB hard drive
- Fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS Works, Navigator, Windows and more

$1499

TOSHIBA

T-1910 Notebook #23-10206

- 486SX 33 processor
- 4MB RAM
- 120MB hard drive
- 9.5" Vivix™ monchrome display
- Pre-loaded software includes MS-DOS and Windows
- Integrated trackball
- Nickel hydride battery



$1799.56

Authorized Reseller

Apple® Macintosh® Performa 575 #12-10481

- 66/33MHz Motorola 68LC040 microprocessor
- 5MB RAM
- 250MB hard drive
- Fax modem
- 14"Sony Trinitron™ color monitor(13"VSS)
- Keyboard and mouse
- internal CD-ROM drive
- PowerPC™ upgradable

$1696.33

COMPAQ

Compaq Presario 920 CDS #12-10469

- 486SX2/66 processor
- 8MB RAM
- 420MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS-Works, Encarta, Windows and more!

Monitor sold separately

$1499.57

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Innova Media 450 #12-10456

- 486DX2/50 processor
- 4MB RAM
- 420MB hard drive
- 16-bit sound card
- Fax modem
- Dual-speed CD-ROM
- Software includes MS-DOS, Lotus Smart Suite, Encarta,Windows and more!

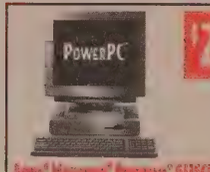
$1699

NCR

An AT&T Company

Dual Scan Color #23-10219

- Intel486™ SX/25 MHz processor
- 4MB RAM
- 170MB hard drive
- 9.5" STN color screen
- 1MB video memory
- Integrated trackball
- Local bus video
- 1 PCMCIA type II slot

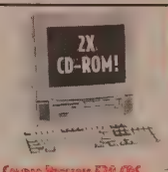


$2699.33

Authorized Reseller

Apple® Macintosh® Performa® 6115CD #12-10483

- 60 MHz PowerPC™ 601 RISC Processor
- 8MB RAM
- 350MB hard drive
- Double-speed CD-ROM
- 16-bit sound card
- Stereo speakers
- 15" Monitor (14.2" Viewable Screen Size)
- Includes $900 of software

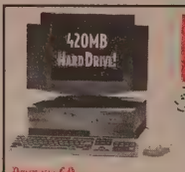


$1696.37

COMPAQ

Compaq Presario 528 CDS #12-10450

- 486SX2/66 processor
- 4MB RAM
- 420MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- 14" color monitor (13" Viewable Screen Size)
- Dual-speed CD-ROM
- includes $850 of software



$1899

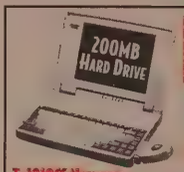
Packard Bell

Monitor Sold Separately

intel inside pentium

Pentium 60 #12-10430

- Intel Pentium 60MHz processor
- 8MB RAM
- 420MB hard drive
- 14.4 fax modem
- Double-speed-CD-ROM
- 16-bit sound card and stereo speakers
- Pre-loaded software and multimedia titles



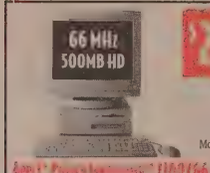
$1999

TOSHIBA

Color Screen!

T-1910CS Notebook #23-10205

- 486SX 33MHz processor
- 4MB RAM
- 200MB hard drive
- Internal PCMCIA slot
- Pre-loaded software
- includes MS-DOS and Windows
- Integrated trackball
- Nickel hydride battery
- 9.5 Dual-scan display



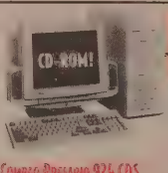
$2899.76

Authorized Reseller

Monitor and Keyboard Sold Separately

Apple® Power Macintosh® 7100/66 #12-10467

- PowerPC™ 601 RISC microprocessor
- 66MHz
- 8MB RAM
- 500MB hard drive
- Built-in CD-ROM drive
- 1MB VRAM
- 32K cache
- 16-bit stereo sound
- Stereo Speakers



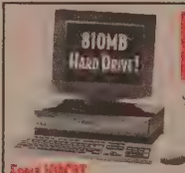
$1896.37

COMPAQ

Compaq Presario 924 CDS #12-10453

- 486DX2/66 processor
- 8MB RAM
- 525MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS Works, Encarta, Windows and more

Monitor sold separately



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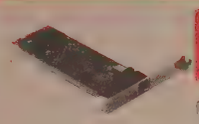

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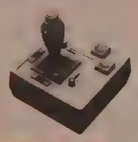

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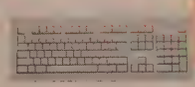

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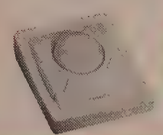

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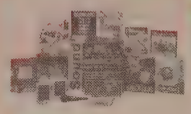

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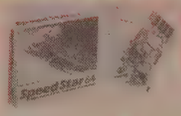

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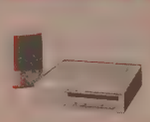

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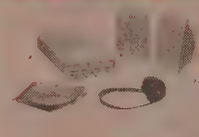

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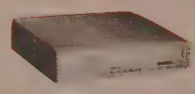

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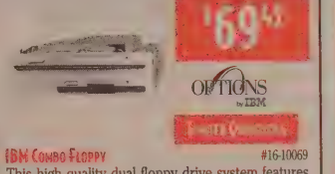

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Sony Magic Link Arrives:

First Available PDA With General Magic Technology

Although the Motorola Envoy was announced long before the Sony Magic Link, the Magic Link has appeared first. Already it's generating a stir in the marketplace, and even some longtime Newton users have switched allegiances after using the new device.

The new Magic Cap-based PDA from Sony, called the PIC-1000 Magic Link, utilizes the Magic Cap and Telescript technology developed by General Magic, discussed in previous months in this space. Although General Magic has raised some eyebrows for creating a rather cutesy "hyper-non-technical" interface, early reports suggest that despite the lack of attention given to the traditional "power user," the interface is remarkably efficient, with many features to help speed data entry and retrieval.

Magic Cap

Magic Cap is an operating system based on a spatial metaphor of everyday objects and settings: you start out sitting at your "desk," with various icons representing functions that you might want to use (a datebook, an IN and an OUT box, etc.). Many of the functions of Magic Cap-based machines are accessible directly from your "desk." The interface is expandable; you can go outside your office and walk down a virtual hallway with more functions, and even leave your "building" and walk down the virtual "street" to access third-party services such as America Online and AT&T PersonaLink email. (I've commented before on what I consider the rather ugly aesthetics of this interface, but of course for some it might be appealing; also, it's apparently possible to customize the interface to a large extent if you wish.)

Some have worried that it might be cumbersome or slow to access information; however, it turns out that a number of accelerators have been built in to alleviate this, and the design allows for shortcuts if necessary. The on-screen keyboard allows data entry by "typing" (no handwriting recognition). The virtual keyboard is much larger than the Newton's little tap-entry keyboard—large enough, in fact, that it's possible to type with your fingers directly on the touch-sensitive screen.

Magic Cap is designed to be implemented by any number of different hardware manufacturers. Using a business model similar to that of 3DO, General Magic does not manufacture machines itself, but rather licenses the technology to third parties. Sony and Motorola have both committed to building Magic Cap-based machines, for example, and others are working on their own devices.

> Early reports suggest that despite the lack of attention given to the traditional "power user," **General Magic's** interface is remarkably efficient.

Every Magic Cap device comes with built-in communication capability. The Motorola Envoy is a wireless communicator and has wireless data transmission capabilities built in. The Sony, by contrast, has a more traditional 2400bps faxmodem built in which requires connecting the unit to a regular phone line for operation. This design, while less portable than the Envoy, has the advantage of being cheaper and lighter in weight.

Magic Link

The Sony unit weighs in at 1.2lbs. and measures 7.5" x 5.2" x 1"; a fairly large size, a bit too big for a pocket, and even larger than a Newton. Though it is selling for less than the Envoy's probable price, it is still a bit expensive at $899. Despite this, however, according to informal reports Magic Links are selling at a brisk pace, and it is difficult to get hold of any of the first run of machines.

The base unit comes with 1MB of RAM, a single PCMCIA Type II slot, and a serial port. The Link takes six standard AAA batteries, but an optional Sony NP500H lithium ion battery can also be used ($79.95) which gives ten to twelve hours of continuous use. This allows several days of average use per charge.

The unit comes with a wide variety of built-in features, including all of the Magic Cap standard services (datebook, calculator, address book). The unit also has AT&T PersonaLink electronic mail support, limited America Online access (email, news, and stock quotes), Pocket Quicken, a speller, a phone dialer (an optional $60 phone headset turns the unit into an actual phone), a couple of games, and the PenCell spreadsheet (a feature I'm particularly happy to see).

One amusing feature is that the device can be used as a Sony remote control (the unit has a built-in infrared port for data transfer).

AT&T PersonaLink email is available for an introductory price of $9.95/month with unlimited email and an 800 access number. I'm not sure how long that kind of pricing will last, but it's a great deal for the profes-

continued on page 48

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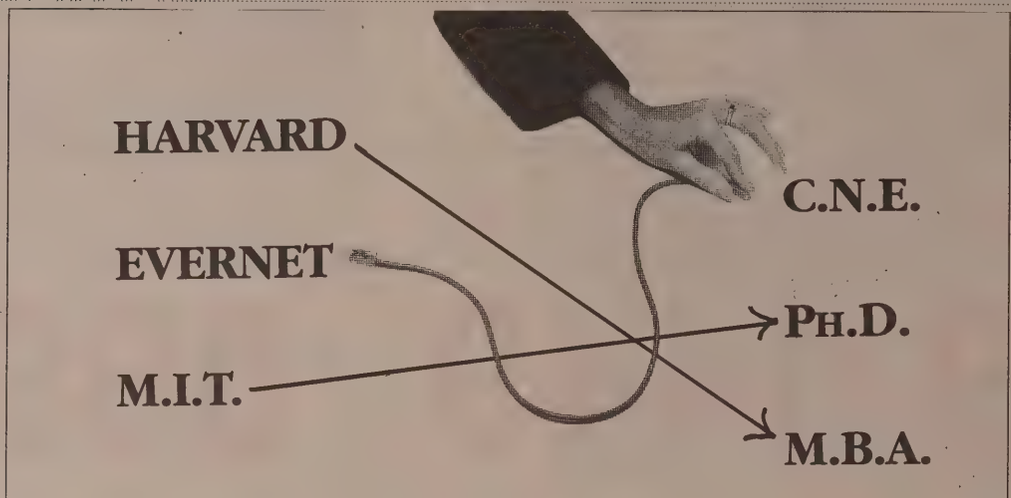
sional on the road; no matter where you are in the country, the service is as close as the nearest phone (well, the nearest phone with a modular phone jack). Gateways are available to a wide variety of different email systems; it's fully linked to the Internet, MCI Mail, CompuServe, America Online, and you can even send messages to SkyTel pagers. Like all Magic Cap mail, PersonaLink supports graphics, animations, sounds, and even MIDI musical "stamps" as embellishments to your messages.

The Sony 1MB static RAM expansion cards are $200; a bit high for RAM, however I have heard unconfirmed rumors that Apple 1MB SRAM cards will work, and they're only around $50 each. Adding a megabyte of RAM will triple your available storage capacity, since only half of the meg that comes standard with the Magic Link is available for data storage. According to some early users' reports it's quite easy to use up that 512K, so adding an expansion card is a good idea (however, keep in mind that adding this card takes up the one and only PCMCIA slot in the machine). The unit is designed to be graceful about handling low-memory conditions, however, prompting you to discard items when it gets low on memory.

AT&T PersonaLink email is available for an introductory price of **$9.95/month** with unlimited email and an 800 access number.

Data entry is designed to be quick and is aided by context-sensitive cues. For example, in the address book, the software will try to guess which city you mean when you enter an address; after you type the first few letters of a city you've entered before, the unit will fill in the rest of the name, as well as the first three digits of the ZIP code (you can either ignore the suggested city, or select it by hitting the "Next" button). "Stamps" can be added to any address book entry, which can be later used to group entries together (for example, all entries with a particular stamp can be accessed later as a group). Data is structured in a free-form manner; the address book allows any number of additional pieces of information to be "stamped" onto a particular entry.

I am particularly happy that this machine comes with the PenCell spreadsheet built in. As an avid user of the spreadsheet capabilities of my Casio SF-R20, I find the spreadsheet gives any portable computer a much greater breadth of application than it would have if restricted to just a simple set of built-in functions. With a spreadsheet you can do everything from financial projections to figuring schedules to planning the itiner-



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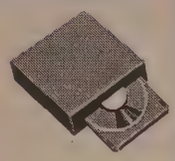

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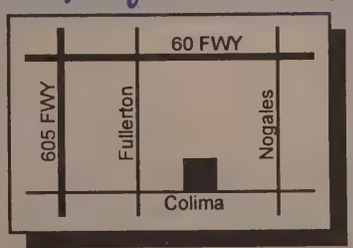

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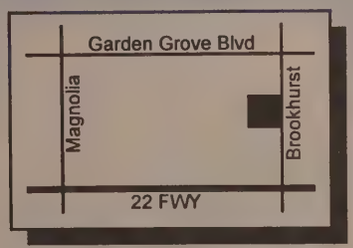

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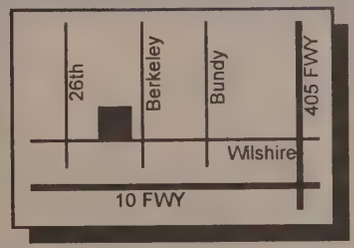

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ary for a road trip. I find spreadsheets much easier to use and more flexible and powerful than regular calculators; whenever I need to do some quick figuring, I can whip out my pocket spreadsheet and be able to keep track of a complicated calculation much more easily than with a regular calculator, because intermediate results can be left in cells in the spreadsheet for later reference (unlike a calculator which has only one value visible at a time).

An optional pager card can be purchased which plugs into the PCMCIA slot and turns the machine into, well, a pager. The only problem I see here is that many, if not most, users will probably want to use their PCMCIA slot for an SRAM expansion card (note: flash RAM is not supported, you can only use an SRAM card—I suspect for power level considerations).

Other optional accessories include an $80 leather carrying case and an external keyboard for $130. The single PCMCIA slot is not quite as bad as it might seem: after all, the Newton only has one PCMCIA slot, and this machine already has a built-in modem (a common use for PCMCIA slots in other handheld machines).

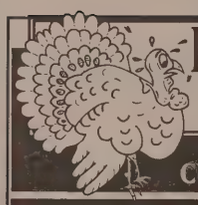
What We'd Like To See

One feature unfortunately missing from the unit is a regular telecommunications program. Although the unit has a lot of built-in support for sophisticated communications using the Telescript protocol, there's no way to dial up a regular terminal-style service. Perhaps a third party will create a small application to address this problem.

Another missing facility at the moment is that, although email support is available, the PC and Mac data transfer products are not yet available as of this writing. However, General Magic claims that the personal computer link will be available very soon, perhaps by the time you read this.

General Magic has been questioned about its developer programs. Developer support for the Magic Cap operating system has been very selective; only the big players have had any support to speak of, leaving smaller players out in the cold. The stated policy of General Magic is that they wanted to give a small number of developers very good support, rather than giving a large number mediocre support. This may or may not turn out to be a good idea; it's obvious that the Magic Link comes bundled with a lot of good and useful software, but it's not clear how much the lack of strong and wide developer support will affect software and shareware availability in the future. For the moment the strategy seems to be working, but it is an area of some concern.

Overall, the Sony Magic Link is an impressive new entrant. Though potentially hampered by a high initial price, the unit is also extremely powerful and comes with a large number of useful built-in applications that put this machine a cut above the rest. Even if you never used the communications



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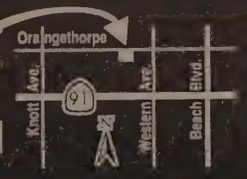

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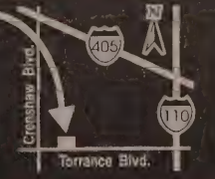

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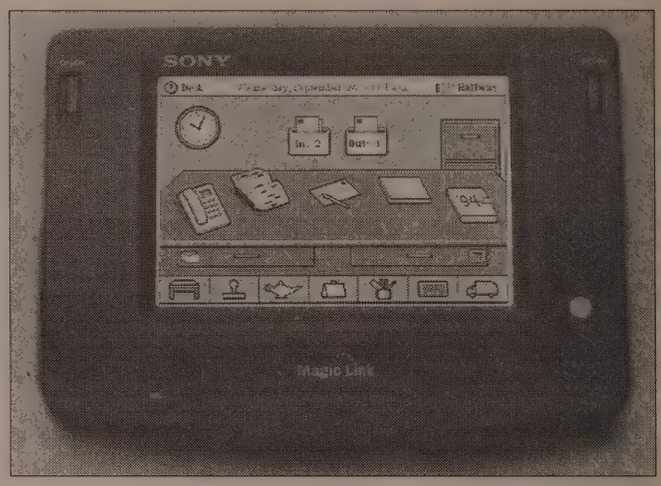

capabilities of Magic Cap and Telescript, the Magic Link has enough features to have formidable potential as just a standalone handheld organizer. More on this unit and General Magic in future columns.

Magic Cap On Your Desktop

An interesting announced plan of General Magic is that a PC and a Mac version of the applications and operating system will be made available sometime next year. This will allow PC owners to use Magic Cap datebook, email, and other applications that can directly interoperate with portable Magic Cap users. The Magic Cap software could make for a very nicely designed desktop personal information manager, and having Magic Cap on your desktop could also make it easier to transfer information back and forth to a Magic Cap-based PDA.

Let's hope that this product, if and when it arrives on the market, will be priced low enough to make it affordable to existing users of the portable product.

Can You Write Graffiti?

You may remember that in a previous column I mentioned that one of the ways in which pen-based handheld users can improve their machines' ability to recognize their handwriting is by modifying their handwriting to fit the machine. Unfortunately, no matter how much you try, there are some symbols that many handwriting recognizers simply aren't able to reliably distinguish (for example, a "5" vs. a capital letter "S").

Palm Computing has taken this idea to its logical conclusion and come up with a new idea which could well do wonders for handwriting recognition as a data entry technology: it's designed a new alphabet which is specifically intended to make handwriting recognition easier. Called Graffiti, the software runs as an add-on to the Newton, Magic Cap, GEOS, Windows for Pens, Microsoft's Winpad, and PenRight! operating systems. It defines a new set of strokes which are designed to be unambiguous and allow for quick and highly accurate handwriting recognition.

According to Palm Computing, the average user can learn to achieve speeds of up to 30 words per minute with 100% accuracy. Seems like an interesting idea worth checking out. Versions for the Newton are not quite ready yet, but the GEOS (Tandy Zoomer) version is available now. ■

RESOURCES:

Sony PIC-1000 Magic Link
Sony Corporation
1-800-342-5721

Graffiti
Palm Computing
1-800-881-PALM

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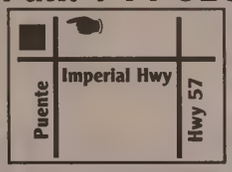

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I am always on the lookout for good full-size keyboards to use with portables and was surprised not long ago to learn that Microsoft was introducing the Microsoft Natural Keyboard designed specifically for Windows users. Since more and more of us are using Windows, it seemed like a keyboard to examine.

Microsoft says it did lots of research in order to find out what keyboard design would best suit people who spend many hours working at their computer. After much research, Microsoft settled on this design. Overall, I am pleased with it.

When you look at the keyboard, you will immediately see that it looks different. The most striking design feature is that the keyboard layout has been redesigned to allow the wrists to remain straight while you are typing. This is accomplished by tilting the keys that you normally strike with your left hand out to the left and skewing those keys that are used by the right hand out to the right. The result is a layout that divides the keyboard into a pattern that includes an inverted V, coming together near the six and seven keys and being furthest apart between the B and N keys.

At first, the keyboard felt weird to me. But after a couple of days, my typing speed was back to normal and my accuracy was perhaps no worse than before. At this point, I don't really know how a standard keyboard would feel to me. Microsoft has also built in a palm rest and a height adjustment on the front edge of the keyboard so you can set it up so the keyboard runs downhill. If you place your keyboard in a tray under your desk, this setting may work for you.

This is the first keyboard I have seen that has software, which is the part I like best. The software gives you the ability to switch quickly between applications and lets you control other features on the display. Microsoft has added three keys to the standard keyboard. Two of these are special Windows keys that trigger a newly designed Task Manager pop-up screen. The Task Manager lets you choose—via the mouse—any of the applications already open. Additionally, there are nine icons along the bottom of the Task Manager window that you can program to open your favorite applications. In order for me to switch between any of my frequently used applications, all I do is hit the Windows key and then press the appropriate function key, or use the mouse. I like this feature a lot.

This is the first keyboard I have seen that has software, which is the part I like best.

If you go into the IntelliType Manager, you can control many features of the keyboard itself, including its basic layout. You can, for instance, convert the keyboard into a Dvorak layout. There are also other aspects of the keyboard that you can control from this window, such as setting it up so that NumLock is automatically turned on or to disable the CapsLock key so you cannot accidentally hit it.

If you press the control key, when you release it a series of concentric circles will appear around the mouse pointer to help you locate it. I think Microsoft missed the boat here. They should have designed it to find the cursor. It is easy to find the mouse pointer by simply moving the mouse. If you routinely have trouble finding your cursor, you can change its blink rate. However, this software also let you adjust many aspects of the mouse operation. The most interesting of these features is the ability to have the pointer reappear at the bottom of the screen if you move past the top of the screen. Likewise, you can move to the left by going off the right edge of the screen. This feature takes some time to get used to, but I think that in the end it will turn out to be useful.

RESOURCES:

Natural Keyboard, $99.95
Microsoft Corp.
One Microsoft Way
Redmond, WA
98052-6399
(206)882-8080

While the keyboard has many features to commend it, the Microsoft Natural Keyboard does have its flaws. First, I still prefer a different placement of the function keys, which Microsoft has positioned across the top of the keyboard. I cannot figure out why so few manufacturers give you the option of having these keys at the left of the keyboard where you can easily chord the keys in conjunction with shift, control, and alt keys. My second layout problem is that Microsoft gives you no option about where the control and CapsLock keys are located. I still prefer the control key to be where the CapsLock key is typically located—to the left of the A key.

A final complaint is that I don't really like the feel of this keyboard, manufactured for Microsoft by KeyTronics. It just doesn't have the crispness I like. In the end, however, preference in this area is pretty much a matter of personal taste and I can't really fault Microsoft for not making a keyboard that corresponds to my taste.

Will I continue to use this keyboard despite my reservations? I suppose I will. While I can get used to the layout differences, I don't want to do without the convenience that the software and the Windows key afford. My hope is that other keyboard manufacturers will pick up the basic concept of this keyboard and begin to make a variety of designs that will meet the personal preferences of a wide range of users.

continued on page 59

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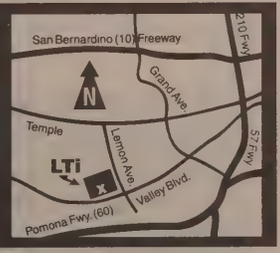

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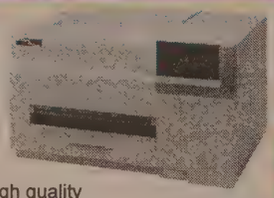

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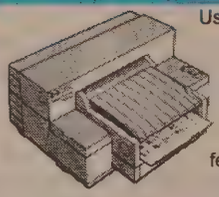

Using an advanced color printing system with HP's exclusive built-in ColorSmart technology, the new DeskJet / DeskWriter 560C delivers optimal color output. Also features resident dual cartridges for convenient black-and-color printing at the same time, clear 600 x 300 dpi black printing, and a variety of internal and scalable fonts!

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HP LASERJET 4 PLUS LASER PRINTER

Featuring incredible **600 dots-per-inch output with a *new 12 page-per-minute print engine***, the new HP LaserJet 4+ is the fastest 600 dpi printer on the market! Plus, 45 internal scalable typefaces and 2MB of standard memory (expandable to 32MB).

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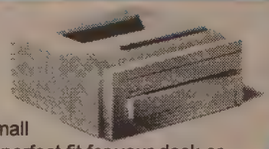

This 300 dpi laser printer is HP's lowesr priced LaserJet ever. In addition to it's sharp looking output, the LaserJet 4L has an incredibly small 14" by 14.5" footprint; the perfect fit for your desk or shelf. Plus, it comes equipped with 26 built-in scalable fonts for professional quality documents.

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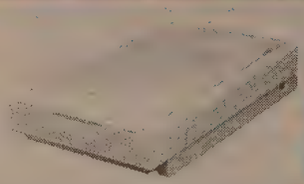

The HP ScanJet IIcx color scanner is the complete solution for true 24-bit color, grayscale and text scanning. Featuring an optical resolution of 400 dpi, the ScanJet IIcx can also process images at up to 1600 dpi using enhanced resolution technology! In addition, this scanner comes equipped with HP AccuPage 2.0 for better text recognition when using optical character recognition software!

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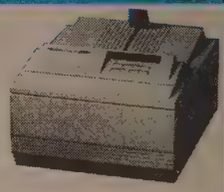
HP LASERJET 4V LASER PRINTER



Do it in double time! This new LaserJet printer features a resolution of 600 dpi and prints at 16 pages-per-minute using a 33-MHz RISC processor, making it the fastest LaserJet printer! The LaserJet 4V also features the ability to print on wide-format 11" x 17" paper, making this printer the perfect choice for CAD/Design professionals.

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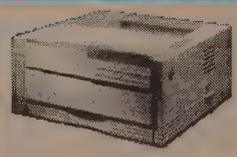
HP LASERJET 4P LASER PRINTER



The HP LaserJet 4P Printer features true 600 x 600 dpi printing. Plus, this compact printer comes with 45 built-in scalable typefaces, enhanced HP PCL5 for seamless compatibility with the HP LaserJet 4 printer, and 2 MB of standard memory (expandable to 26MB).

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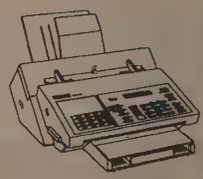
HP FAX-900 FAX MACHINE



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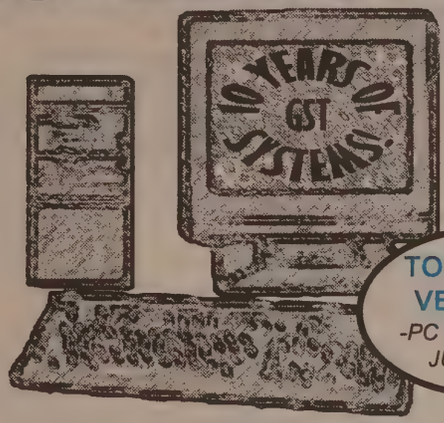

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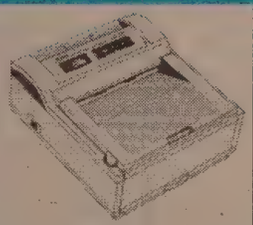

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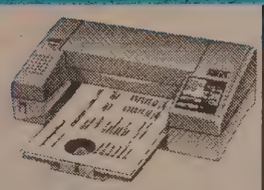

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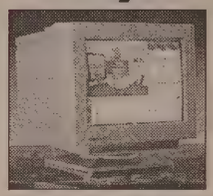

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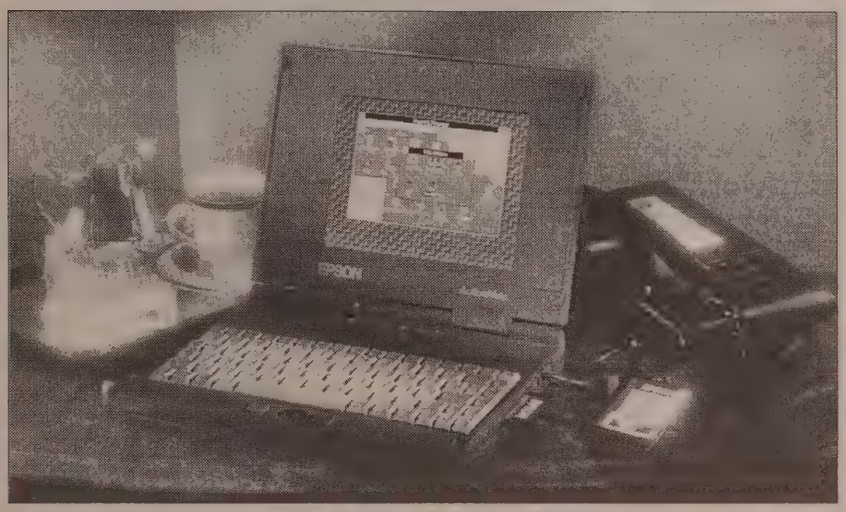
Laptops *continued from page 54*

Computer Of The Month

Epson's ActionNote 700C

Epson is an old and trusted name in the computer business. A division of Seiko, it quickly established itself as a major supplier of printers. In time, however, it lost the lead to Hewlett-Packard, who still dominates the printer market. Epson has been able to maintain a presence in the portable market since nearly the beginning. Recently, it introduced a long-awaited line of portables that includes models ranging from an entry-level monochrome screen with a 120MB hard drive ($2149) all the way up to its top-of-the-line active matrix color model with a 260MB hard drive ($3699). This month, I examine the mid-range model with a dual scan passive matrix color display and a 210MB hard drive ($2799).



Epson has been able to maintain a presence in the portable market since nearly the beginning.

I waited a long time for this machine. The original press release arrived nearly a year ago, but shipment did not actually begin until June of this year. While I can find no particular fault with this machine, it points out just how rapidly the portable market is growing and changing. In its design phase, this series probably seemed like a powerful entry, but by the time it actually shipped, a 486DX processor running at 33MHz is nothing to get excited about. Make no mistake about it, this is nothing to be ashamed of, but on the other hand, there are faster machines on the market. This machine, however, does have much to commend it.

It weighs in a little lighter than many comparable units at 4.9lbs. The 8.5" x 11" footprint is pretty standard. Its 1.6" thickness partly accounts for its light weight. ActionNote 700C comes standard with 4MB of RAM, expandable to either 8MB (additional $399) or 20MB (additional $1399). The hard drive is removable and can upgraded. More and more, I am coming to believe that the 1.8" hard drives will be dominate in the future because they can be standardized and therefore can fit into almost any computer. Currently, the hard drive for this notebook is only available from Epson, which limits your options.

Epson builds a nice keyboard into the unit. It has a good feel and layout. If you decide to buy a full-size keyboard, it will easily plug into the port on the side of the unit. You can attach either a keyboard or a mouse through this port. There is a built-in trackball, which I like only moderately well. When you are on-the-go, these devices are sure handy, but for serious work back at your primary work site, they are a hindrance. This one, however, is placed in the center of the unit just below the space bar. If you want both an external keyboard and a mouse, you will have to use the serial port for the mouse.

The display is clear and bright, but you still have the option of installing a VGA or super-VGA monitor through the video port on the back of the machine. While I am impressed with the quality of dual scan passive matrix color displays, I do notice that they do not have as wide a viewing range as the active matrix models. If you will have more than one person looking at a display, you might want to consider this limitation before making your purchase.

Epson has included a 9600/2400 baud fax/modem as standard equipment, and also builds in a PCMCIA slot. This configuration gives you many options.

The ActionNote is loaded with power management software and comes with a good nickel metal hydride battery that should go for at least three hours on the color models and up to six on the monochrome unit. Hot swapping allows you to change battery packs without powering down. Extra battery packs are available ($149).

These days, when you buy a notebook computer you are buying a lot more than just the machine itself. Service is such an important component that you must be careful to insure that you will be taken care of if the worst should happen. Epson has gone the extra mile in this

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regard with their three-year warranty that pays shipping both ways and guarantees to get you a replacement machine by overnight express if you phone them before 3:00. Their idea is that you can remove your hard disk and plug it

These days, when you buy a notebook computer you are buying a lot more than just the machine itself.

into the replacement the next day. It is a pretty slick concept and equals any service program I have seen. They have an 800 number, which I checked out and gave up on after being put on hold for more than 15 minutes.

While there are less expensive notebooks on the market through some of the direct sales outfits, street price of this machine may bring it down into the same price range and give you the added benefit of a local dealer for face-to-face support. A final bonus is a wide range of pre-installed software and a nice carrying case that has room for a few accessories including the AC adapter in addition to the computer. ■

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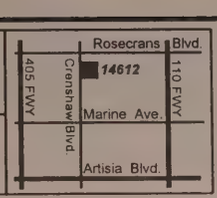

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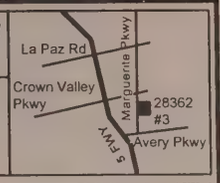

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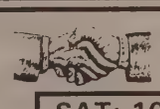

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TELECOMMUTING • BY ROBERT MOSKOWITZ

The State Of Telecommuting

A Look At The Commute In Los Angeles And Elsewhere

Southern

California's Commuter Transportation Services, Inc., has just issued its sixth annual "State of the Commute" report, containing some kernels of surprising information along with a lot of expected detail on physical travel to and from work.

For example, nearly a third of commuters surveyed for 1994 say freeway traffic is better than last year, compared with only about 20% who said traffic improved from 1992 to 1993.

But satisfaction with the commute is a two-edged sword, and ride-sharing three or more days per week appears to have been abandoned by some ninety thousand commuters, falling to 1.28 million commuters from 1.37 million in previous years. Among a total of some 6.6 million commuters in the region, only 14% carpool, only 2% ride the bus, and only 1% walk, vanpool, or bicycle to work.

More optimistically, however, the survey shows that 12.5% percent of employees in the region have the opportunity to work at home instead of commuting to their employer's place of business, a major increase from the 10% reported in all of the Commuter Transportation Services' earlier surveys. Of those with this opportunity, 86% actually do telecommute, and together they average four days per month working away from the office.

As you might expect, the opportunity to telecommute is not evenly distributed among employees. For example, 27% of senior managers can telecommute to work, but only 9% of middle managers, and only 3% of secretarial/clerical workers. Fourteen percent of men say they can telecommute if they choose, but only 11% of women receive a similar option from their employers.

Fourteen percent of **men** say they can telecommute if they choose, but only **11%** of **women** receive a similar option from their employers.

The freedom to telecommute also varies by other factors, such as industry and company size. Service providers (19%) and financial companies (17%) lead all other industry classifications, while aerospace offers its employees the fewest telecommuting opportunities (3%). Companies with fewer than twenty-five employees tend to offer 17% of their employees the chance to telecommute, while companies with more than one hundred employees offer this flexibility only to 10% of their workers.

Another, less important factor in having the opportunity to telecommute is an employee's county of residence. For example, 13% of employees living in Orange County can telecommute if they wish, while only 9% of employees living in San Bernardino County reportedly can do so. Los Angeles, Riverside, and Ventura county dwellers all reported in at 12%.

Of those given the chance to telecommute, a minimum of three-quarters always arrange for some days of work away from the office, and the rate of telecommuting acceptance reaches a high of 88% for those given the option who live in Los Angeles and Riverside counties.

A special part of the survey addressed how the region's commuting habits were changed by the January earthquake. One thousand people who work full-time away from their homes were interviewed by telephone about three weeks after the earthquake. To minimize errors introduced by respondents' erratic or unsubstantiated memories, these results were compared with results from earlier surveys.

As predicted in this column, telecommuting was never used as a major remedy to the January earthquake, and commuting habits shaken up by the temblor have largely returned to their pre-quake patterns. That primarily means 6.6 million people travel to work an average of sixty-seven minutes, and an average distance of 33 miles, round-trip, five days a week. The environmental, economic, and emotional costs of that much commuting are—and inevitably must be—staggering, and are probably near maximum because an incredible 81% of these people habitually drive alone in their cars both to and from work—more than in previous years studied.

The survey shows that 57% of the region's commuters (and nearly 80% of those in highly affected areas) made some change in method of getting to work as a result of the earthquake, including moving their resi-

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dence or work location, or changing their means of transportation, their route, their time of travel, or their work arrangements.

However, none of these changes generally tended to reduce the total number of trips or miles traveled to and from work. On the contrary, 30% of commuters reported an increase in their commuting times and distances, making the overall average duration of commute trips increase from about 56 minutes to 69 minutes (and for long-distance commuters, on average from 86 minutes to 109 minutes). In fact, about a third of those commuters whose trips to work got longer (or about 10% of the region's total commuting population) reported a doubling of the time required to get to work each day.

Only 5% of commuters reported switching to ride-sharing. Only 2% switched out of cars to bus and rail transportation.

As many as 4% of the region's commuters tried telecommuting as a result of the earthquake, but a separate 3% had to stop telecommuting for the same reason. The net increase due to the earthquake, therefore, was only 1%. Another 6% of commuters claimed that a shift to flexible hours or compressed work weeks resulted from the impact of the earthquake.

Generally, rather than turn commuters into telecommuters, the earthquake prompted commuters to navigate a better route, endure longer commutes, shorten their work days, or adjust their working hours. In fact, many commuters started driving alone to work in order to accommodate one or more of these three changes.

Survey analysts conclude from all this, without much argument from experts outside the organization, that traffic congestion will have to get much, much worse before the bulk of commuters may be willing to give up their cars for other transportation methods. Even worse, the need to make adjustments to increased congestion may actually make solo driving more desirable than other alternatives. While telecommuting is clearly a viable alternative to physical transit, too few workers presently spend too few days telecommuting to make up for all those who are still

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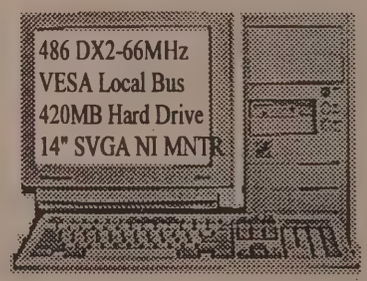

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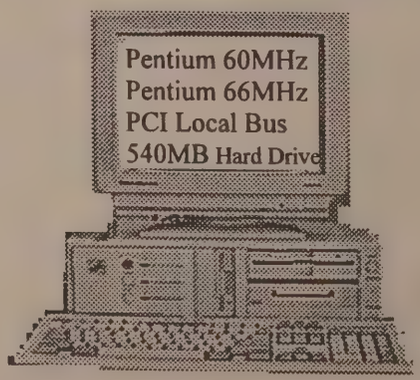

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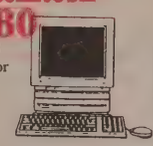

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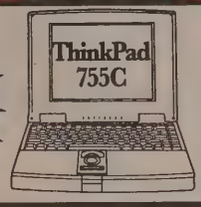

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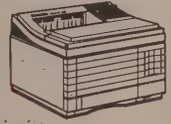

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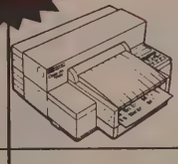

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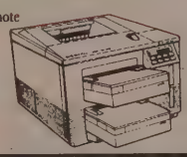

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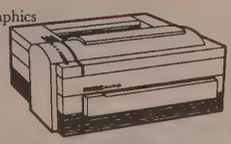

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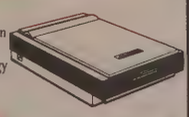

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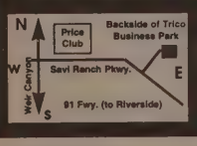

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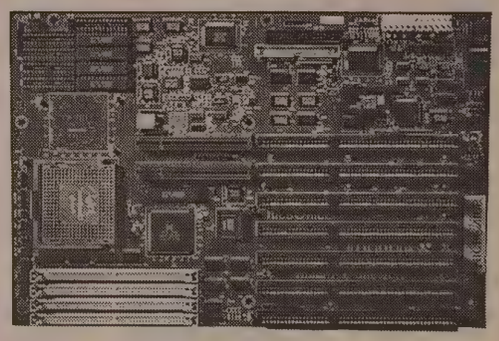

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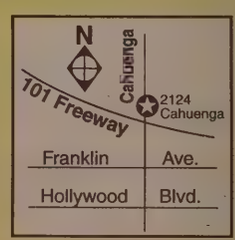

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Telecommuting *continued...*

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This year's survey is based on telephone interviews with 2625 residents in Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties.

TRP 2000 Teaches Telecommuting In Denver

A telecommuting outreach program that has trained more than one thousand managers and employees in and around Denver is attracting increased attention from corporate leaders and others concerned with reducing physical travel to and from work. Owing to increased demand, the seminars will now be offered every month.

The TRP 2000 training program began with an emphasis on travel reduction, but in recent years has grown to focus on a broad range of flexible workplace strategies, including office sharing, alternative work schedules, and, of course, telecommuting. The training curriculum occupies four full days, and covers virtually every aspect of telecommuting and telecommuting management, as well as traditional aspects of employee trip reduction.

The program's trainers concentrate on showing business executives how flexible work policies can reduce any organization's expenses while maintaining or increasing productivity, and on giving employees the information, skills, and background they need to perform successfully in today's flexible workplace. Each participant leaves with a customized, realistic flexible workplace plan.

New Software Lets Telecommuters Share Displays

If you're working on a computer and need to collaborate with someone else who's not at your same location, there's new software that promises to make this process a great deal easier.

On the market for some time, so-called "remote-control" software has always promised to let two people view and control one computer. Today, at last, that promise is starting to come true, although the link is still limited to just two computers at a time.

One of the most interesting products with this capability is LapLink for Windows. Long one of the leading packages for file transfer between computers, this first implementation for Windows now incorporates a "remote control" function that operates with equal ease over a cable, a network, or a dial-up telephone wire.

Basically, you run the software and use it to establish a link over the available medium (selected from a list of possibilities you've preestablished). Then, you simply launch applications, load data files, and work to your heart's content.

It's disquieting, at first, to see your computer operating under the control of someone at a distance, or, from the other perspective, to be working your own keyboard and mouse but seeing a different set of files and directories on your familiar monitor.

But the systems work beautifully, and allow you to have a "virtual" presence in someone else's office for the price of a telephone call. Some let you edit the original files on the computer disk, others create new copies of the original files for editing, automatically preserving the original versions.

In addition to LapLink (from Traveling

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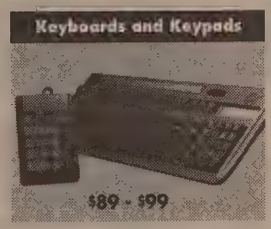

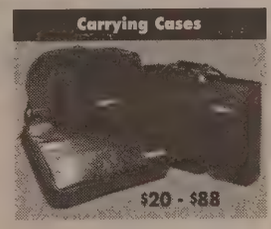

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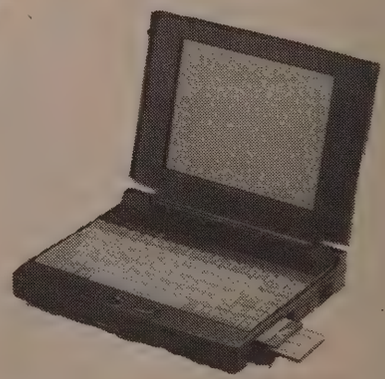

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Telecommuting *continued...*

Software), other powerful programs for distance working include ProShare (from Intel), FarSite for Windows (from Databeam Corp.), and Face to Face (for two Macs, or one Mac and one Windows computer, from Crosswise Corp.). These utilities are helping to usher in an era when the distance between collaborators is of very little consequence in determining how effectively work can be accomplished.

Asia Pacific Telework Association

There's a new organization in the world of telework: The "Asia Pacific Telework Association." Founded only a few months ago, the APTA is concerned with developments and activities around the world, but concentrates in a "backyard" occupied primarily by Australia and New Zealand. The organization has already attracted nearly a thousand inquiries about its activities and objectives, which in addition to signing up telecenters, corporations, and teleworkers as members, include:

1) Representing the interests of members looking for work and for international contacts.

2) Maintaining contacts with like-minded organizations, around the world.

3) "Making representations" (which I take to mean advocating) with regard to telework-related developments, and also on behalf of members' interests.

For example, under a quirk of Australian law, a copyrighted work transmitted by paper or by computer disk is fully protected from piracy or theft, but the same work loses all copyright protection when transmitted electronically! The APTA says it knows of instances when material has knowingly been stolen and used without payment by the simple expedient of passing it through an electronic network. The problem extends not only to writers, but to lawyers, accountants, engineers, architects, computer programmers, and others who utilize electronic networks. APTA is lobbying to have the appropriate changes made to the present Australian law.

In the US, fortunately, copyright protection laws have been written more broadly, and courts have usually interpreted the laws to provide copyright protection in all media. Generally everything created in the US is automatically afforded copyright protection unless we give away such protection in writing. So you're free to deliver material to a client or employer by any means, without giving up the right to be paid for it.

Back in Australia, the APTA says the Australian Department of Primary Industries and Energy has committed to doubling the number of rural "telecentres" to forty-five or fifty over the next two years. These telecentres are used to earn income, to provide community services, and to gain work-relevant skills. In addition to these government-funded sites, there are many privately funded sites offering electronic messaging, telework stations, and more. Reportedly, the "small office and home office" sector of the Australian economy has been the fastest growing one in recent years. ■

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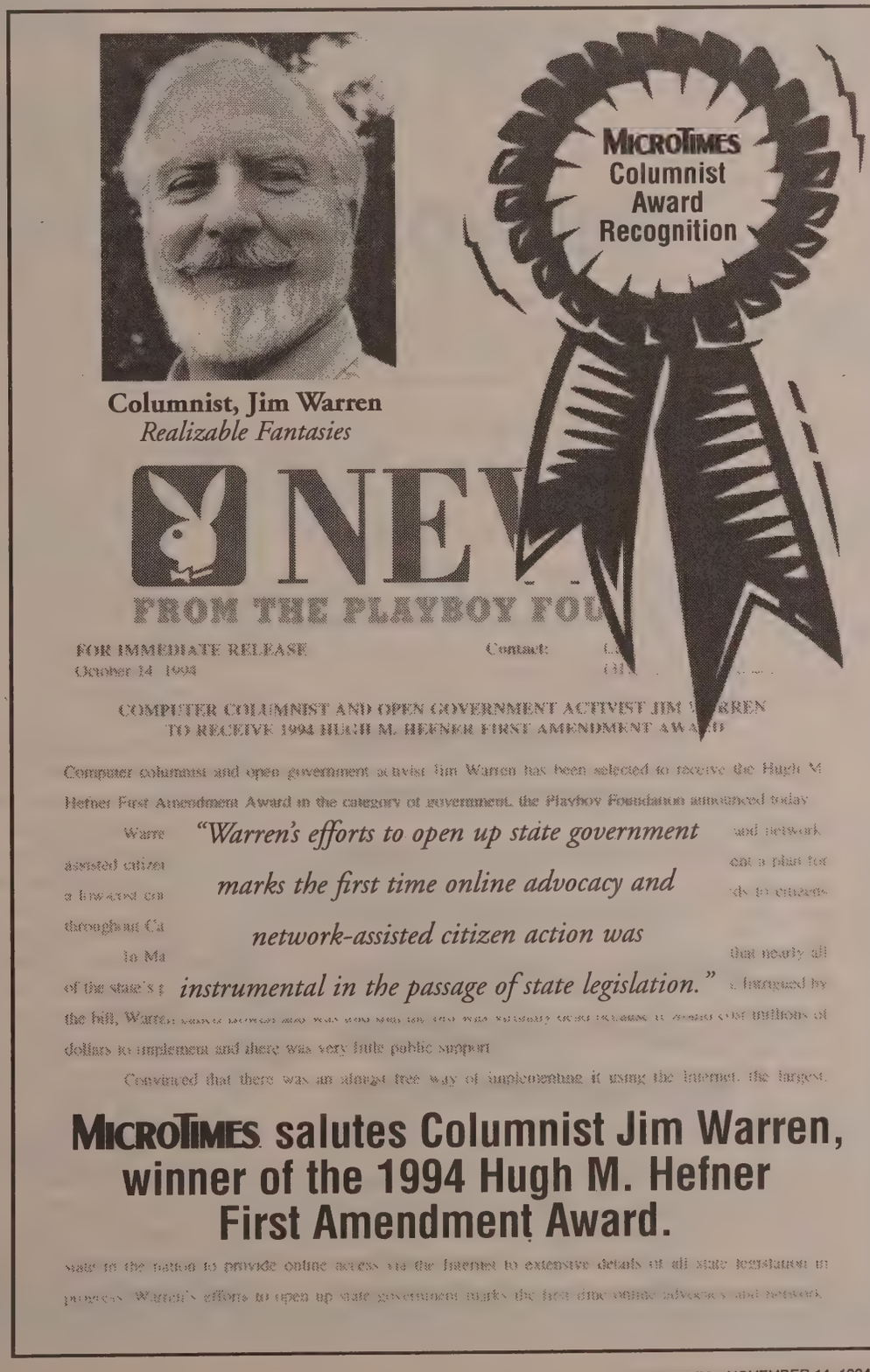
MICROTIMES
Columnist
Award
Recognition
Columnist, Jim Warren
Realizable Fantasies
FROM THE PLAYBOY FOU
FOR IMMEDIATE RELEASE
October 14 1994
Contact:
COMPUTER COLUMNIST AND OPEN GOVERNMENT ACTIVIST JIM WARREN
TO RECEIVE 1994 HUGH M. HEFNER FIRST AMENDMENT AWARD
Computer columnist and open government activist Jim Warren has been selected to receive the Hugh M
Hefner First Amendment Award in the category of government, the Playboy Foundation announced today
Warre
assisted citizen
a lawsuit on
throughout Ca
In Ma
of the state's
the bill, Warre
dollars to implement and there was very little public support
"Warren's efforts to open up state government marks the first time online advocacy and network-assisted citizen action was instrumental in the passage of state legislation."
and network
cal a plan for
ds to educate
that nearly all
s lobbied by
Convinced that there was an almost free way of implementing it using the Internet, the largest
MICROTIMES salutes Columnist Jim Warren, winner of the 1994 Hugh M. Hefner First Amendment Award.
state in the nation to provide online access via the Internet to extensive details of all state legislation in
progress. Warren's efforts to open up state government marks the first time online advocacy and network

LANS • BY PETER JOHN HARRISON

The All-Purpose Network Administrator

A Typical Day's Work Requires A Diversity Of Skills

Network administrators usually do more than maintain the health of the network. They are called on to do everything from teach network users how to use their word processors to providing technical support when users can't get their programs (which use the network, but don't run the network) to work the way they want them to.

Who else would you want to call? It frequently seems that some problems are fixed by the mere presence of a network administrator. He or she doesn't have to do anything... Just stand there and watch, while a user sheepishly tries to explain that it really wasn't working a moment or two before you came in.

It frequently seems that some problems are fixed by the mere presence of a network administrator.

Oftentimes I chalk these effortless problem solutions up to users just thinking more carefully when there's someone looking over their shoulder. Other times, problems can be tracked down to more than one user trying to access an online database record or file that's been "locked" by another user. Sometimes, though, the problems network administrators are faced with almost defy explanation. Take the case of the recalcitrant mouse.

It had become a morning tradition of sorts. I'd come in, check my phone messages, then try to get a user's mouse to work. It just wasn't tracking right; it moved just fine from left to right and back again, but its up-down movement wasn't smooth, and sometimes it wouldn't track up or down movement at all.

My initial guess was that there had to be some dust or lint in the opti-mechanical mouse mechanism, so I pulled out a can of pressurized air, removed the ball from the mouse, and blew the mouse out. That seemed to solve the problem. At least until the next morning.

Most mice are opti-mechanical mice, meaning that they have a little ball in the bottom that rolls around as you move the mouse. As the ball rolls, it spins two little disks with slits in them—one for movement left and right, another for movement up and down. The mouse tracks its up-down left-right movement by shining a little light at the disk, and as the slits on the disk move, the light blinks through at a photo detector on the other side. Each blink of light tells the mouse it's been moved a certain distance up and down or left and right.

When lint, hair, and other debris get inside the mouse, it can obstruct the light path, causing the mouse to move erratically. Taking the mouse ball out and blowing "canned air" into the mouse usually cleans the dust out. Sometimes you have to open the mouse by unscrewing the cover and blowing air directly at the rotating disks, and most of the time that will fix a mouse that isn't moving well.

Not this time. The next morning it was doing the same strange thing. So, I replaced the mouse with a new unit. Problem solved—I thought. Next morning I was back, scratching my head, wondering why these things always seem to happen early in the morning, before I've had my coffee.

It was driving me crazy. Every morning the mouse would quit, tracking correctly from right to left, but not up and down. Then, every morning a few hours later, without any help from me at all, it would magically fix itself. Then I came in early one day and watched.

The answer was the sun. Early mornings it would stream in through the window next to the desk where the errant mouse sat, bright and beautiful, and with more than enough light to shine through the (as it turned out) not-quite opaque case of the mouse. Once the sunlight had made it into the mouse, it activated the photo detector that tracked "up-down" movement, so the mouse couldn't tell when it was being moved that way.

Once I had a good guess at what the problem was, the answer was simple—pull the window shade down. It wasn't an elegant, technical solution to the problem, but it worked.

So, my tale of mouse and man has a moral. Some problems don't require fancy technical solutions, because sometimes the technology itself is the problem. ■

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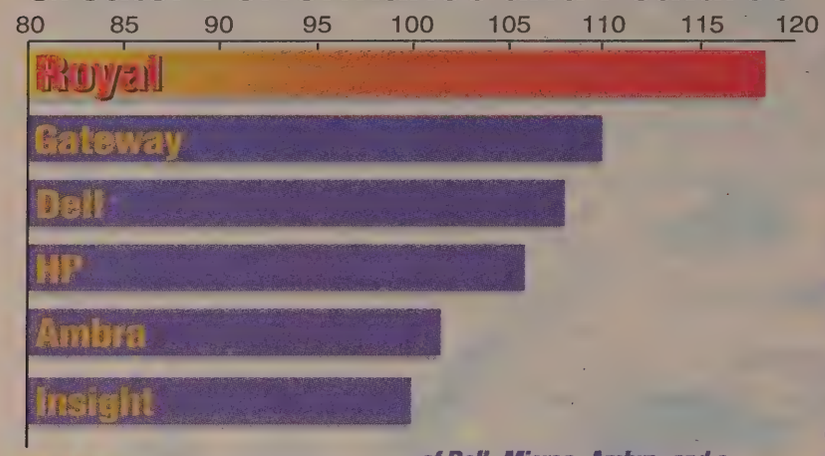

PC MAGAZINE

Sept. 27, 1994

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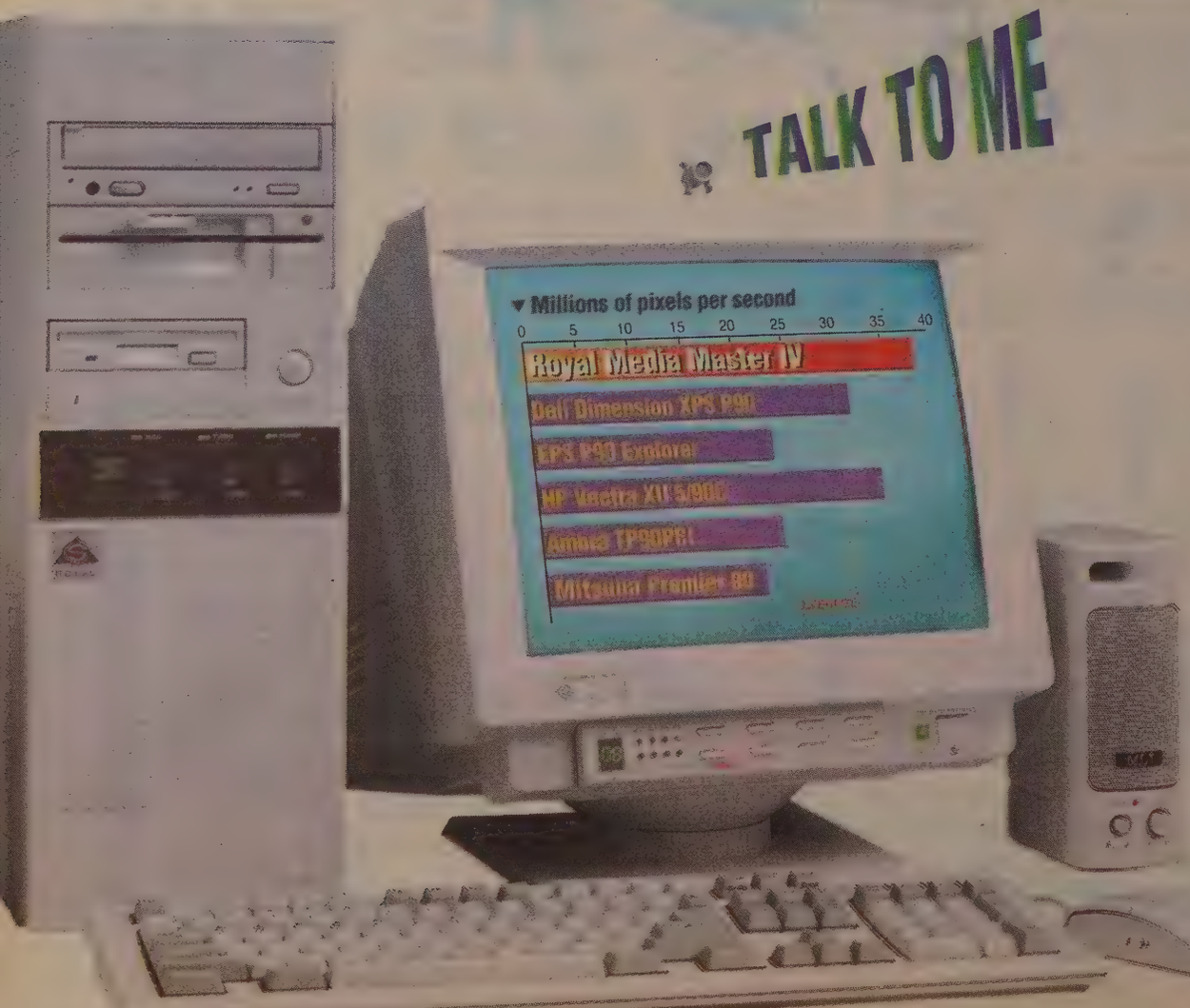

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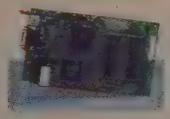

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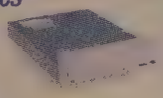

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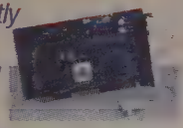

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Sept. 27, 1994

intel inside

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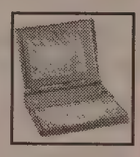

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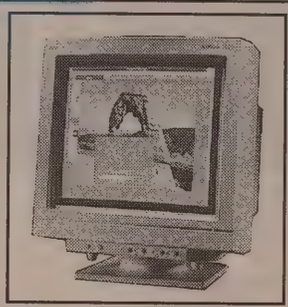

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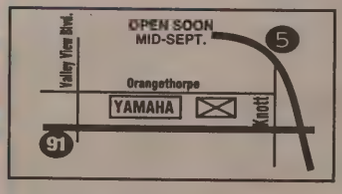

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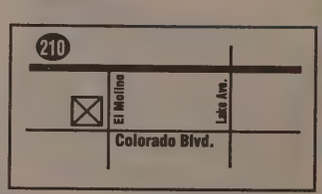

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The Home Page Thing

Publishing On The World Wide Web

There's never been anything quite like the World Wide Web. Technically, the Web is a document delivery system based on hypertext, but that doesn't begin to account for the way it's captivated the public imagination.

The Web is thoroughly infused with hypertext: Web documents are formatted with the Hypertext Markup Language (HTML), and the protocol used to connect Web clients and servers is called the Hypertext Transport Protocol, HTTP. Web servers themselves are often called HTTP daemons.

Hypertext is really nothing more than text that doesn't have to be linear. The distinguishing feature of hypertext documents is that they offer the reader alternate paths through a single document or sets of documents.

The term hypertext was first coined by Ted Nelson twenty-five years or so ago. The hypertext concept, however, is as old as writing. Footnotes and glosses in the margins are the predecessors of computerized hypertext.

Proliferation Of The Web

To its credit, the Web does make hypertext pretty if you happen to have robust display hardware and a fast Internet connection. But even this doesn't really account for the explosion of interest in the World Wide Web.

As recently as eighteen months ago, the Web was an obscure creation of the academic wing of the Internet community. In mid-1993, there were approximately two hundred Web servers worldwide. Most of these systems brokered information about esoteric fields of research like High Energy Physics. (The Web and its protocols were the creation of the Center for Nuclear Research [CERN] in Bern, Switzerland.)

Now, however, there are more than thirty-five hundred Web servers on the Internet, and they offer information on a wide variety of topics outside the conventional academic disciplines. There are archives on the Web for everything from the Louvre to Frank Zappa.

Interest in the Web is so widespread that it is rapidly becoming a necessary feature of the software environment that an Internet host must offer, something akin to the core services FTP and telnet.

Web Publishing

Helping to fuel Web mania is the realization that the Web offers a relatively easy way for users to publish things on the Internet.

Publishing information on the Internet using the Web is basically a two-step process. First, compose hypertext pages for the information to be published. With the hypertext in hand, register your hypertext document with a Web server.

"Registering a hypertext document" sounds more formal than it is. You've registered your document when you have a Uniform Resource Locator, an URL, that a Web server can use to locate your document and ship it off to any client that requests it.

URLs are the basic currency of the Web. A simple URL looks like this:

http://www.dnai.com

This URL says that the resource being pointed to is a hypertext page (http), and that it's located on a Web server at an

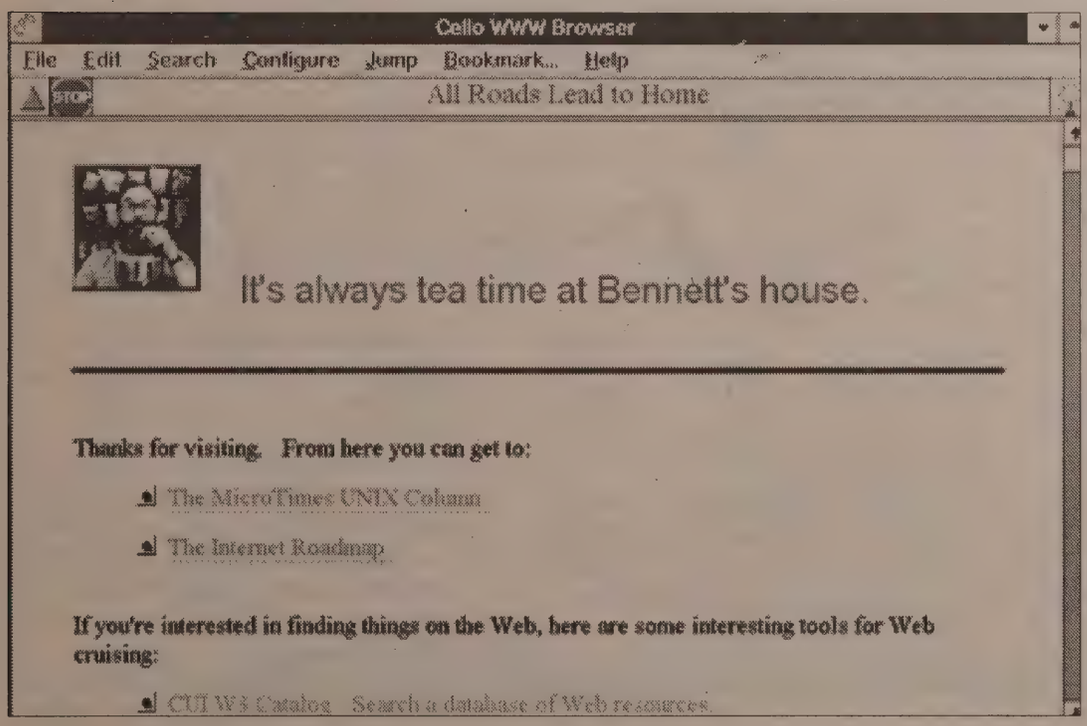
Cello WWW Browser
File Edit Search Configure Jump Bookmark... Help
All Roads Lead to Home
It's always tea time at Bennett's house.
Thanks for visiting. From here you can get to:
The MicroTimes UNIX Column
The Internet Roadmap
If you're interested in finding things on the Web, here are some interesting tools for Web cruising:
CUI W3 Catalog Search a database of Web resources.

Figure 2: Minimal Template for an HTML Document

```
<!DOCTYPE HTML PUBLIC> <HTML>
<HEAD>
<TITLE>Page Title</TITLE>
</HEAD> <BODY> <H1>Heading
</H1>
<P>This page is under contstruction. </P>
<P><i>Copyright (C) 1994 </i>
</P>
</BODY>
</HTML>
```

Internet site named www.dnai.com. "www.dnai.com" is a fully qualified domain name that uniquely identifies a computer on the Inernet. This simple URL will retrieve the root page from the Web server at www.dnai.com.

URLs can become a lot more specific than that. For example:

http://info.cern.ch/hypertext/DataSources/bySubject/Overview.html

retrieves a hypertext document named Overview.html from the computer named info.cern.ch. The Web server there will find this document in the directory path /hypertext/DataSources/bySubject.

Many, but by no means most, Web servers allow users to publish documents from their home directories. One site that does this is dnai.com (Direct Network Access in Berkeley) mentioned above. The Web server there is configured to search for directories named "public_html" in the home directories of the system's users. When it finds a public_html directory, the server looks for a file named "index.html" and displays that. If it finds none, it constructs an index to any files with the html suffix. A user can publish information on the Web by simply creating an index.html file that points to the information. The server uses a special URL to identify these files. To load the index.html file from the bfalk account at dnai.com, use this URL:

http://www.dnai.com/~bfalk

This tells the server to look in my home directory at dnai.com and get the index.html file from the directory public_html. If all goes well, you'll get the hypertext page shown in Figure 1.

Not all Web sites allow users to publish information in this way. The WELL, for example, publishes hypertext pages for its users by putting them in a special directory hierarchy. This is a little more labor intensive and requires working things out with the adminstrator of the Web server, but it works just as well.

Building Documents

All of that, of course, leads to questions about how to build hypertext documents. Fortunately, the process is not particularly difficult. HTML documents are ASCII files that contain HTML tokens. The tokens do three basic things: delimit the document's sections, do some limited formatting of the document, and tell the Web client about links to other documents.

A bare-bones template for hypertext documents appears in Figure 2. The whole document is enclosed in a pair of tokens (<HTML> and </HTML>) that mark the start and end of the HTML document. Within the document itself there is a header (delimited with <HEAD> and </HEAD>) and a body (delimited with <BODY> and </BODY>).

In addition to these large document components, HTML provides several levels of header declarations (<h1> through <h6>) that can be used to heighten the outline of a document.

The section and header delimiters are typical of HTML commands in general. Most HTML commands are enclosed in angle brackets (<>). Most commands have two tokens associated with them, one to start the action associated with the command, and one to stop the action. The "stop" tokens simply add a "/" prefix to the keyword for the command. HTML commands are not case-sensitive: <HEAD> and <head> are the same command.

Formatting an HTML document is basically a matter of inserting paragraph breaks, indentations, and emphasis commands (italics and boldface) at appropriate places in the text. HTML will ignore any blank lines you insert in your text. To force a paragraph break, use the delimiters <P> and </P>.

HTML supports two kinds of indented lists. To create an indented list of bulleted items, use <ul> and ; to create an indented list with the items numbered automatically, use <ol> and . It is not necessary to end a paragraph to begin an indented list. Each item in the list must be marked with the token <LI>.

In Figure 3, the source code from the top portion of the bfalk home page illustrates the paragraph commands and the indented list of bullet items.

Bold face and italicized text are marked with , and , respectively. Some formatting details (font and point size selection, for example) are not handled in HTML. Instead, these are determined by the configuration of the browser you use to read Web documents.

The heart of HTML is the ability to program links that lead from one document to

Figure 3: Partial Source Code for Bennett's Home Page.

```
<!DOCTYPE HTML PUBLIC>
<HTML>
<HEAD>
<TITLE>All Roads Lead to Home</TITLE>
</HEAD>
<BODY>
<H1><IMG SRC="tinybkf.gif">
It's always tea time at Bennett's house.</H1>
<HR>

<P>Thanks for visiting. From here you can get to:</P>
<UL>
<LI><A HREF="http://www.dnai.com/~bfalk/microx.html">The MicroTimes
   UNIX Column</A>
</LI>
<LI><A HREF="http://www.dnai.com/~bfalk/roadmap.html">The Internet
   Roadmap</A>
</LI>
</UL>
```

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another. HTML uses the commands <A> and </A> to mark hyperlinks. Any text that appears between these two tokens will become the anchor for the link. Depending on the browser you use, the anchor will be marked or highlighted in some way that allows the reader to select the anchor and jump to the document it points to. (GUI browsers use graphical notations for anchors: underlining, boxes, or color changes. The line mode browser www identifies each anchor with a bracketed number.

HTML uses the identifier HREF to tell the browser what document an anchor points to. HREFs look like this:

<A HREF="http://www.dnai.com/~bfalk/microx.html"> Microx </A>

The HREF specifier is just inserted into the <A> token. In this example, the anchor "Microx" will appear in the text. When the reader selects that anchor, the browser will look up the URL idenified as the HREF for this anchor. HTML supports several conventions for building HREFS that point to specific portions of documents, but that's an advanced topic outside the scope of this article.

One particularly attractive feature of HTML is the ability to merge images into hypertext documents. This is done with the <IMG> command. The command that displays the tiny photo of me on the bfalk home page is:

<IMG SRC="tinybkf.gif">

For this to work, there must be a file named tinybkf.gif in the public_html directory of the bfalk account. In fact, an URL could be used to load an image file from some other Web server.

There are many more things the enterprising user can do with HTML, but the few commands given here are enough to begin publishing information on the Web to a worldwide audience. ■

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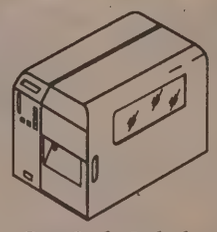

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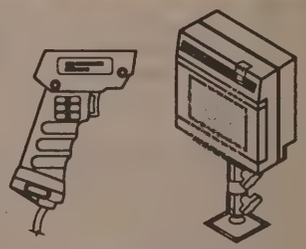

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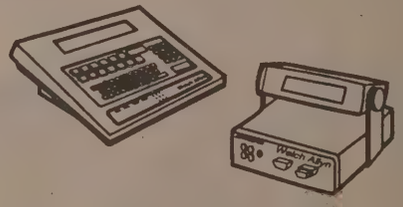

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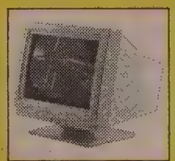

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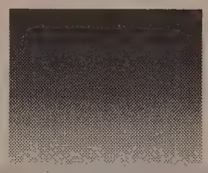
What Is The Internet, Anyway?

This column almost always mentions the Internet, and in the press you read about the Internet as the prototype of the Information Highway; as a research tool; as open for business; as not ready for prime time; as a place your children might communicate with (pick one) a. strangers, b. teachers, c. pornographers, d. other children, e. their parents; as bigger than Poland; as smaller than Chicago; as a place to surf; as the biggest hype since Woodstock; as a competitive business tool; as the newest thing since sliced bread.

A recent *New York Times* article quoting one of us as to the current size of the Internet has particularly stirred up quite a ruckus. The exact figures attributed to John in the article are not the ones we recommended for such use, but the gist of the article was correct in saying that we don't believe the Internet is as big as many other estimates have said. Our estimates are based on several sources of information, including a survey of most of the organizations on the Internet.

Succeeding discussion has shown that many people want to believe the Internet is very large. Some want to believe it so much that they want to count computers and people that are probably *going to be* connected some time in the future, even if they are not actually connected now.



Many people want to believe the Internet is very large. Some want to believe it so much that they want to count computers and people that are probably going to be connected some time in the future, even if they are not actually connected now.

We prefer to talk about who is actually on the Internet and on other networks now. We'll get back to the sizes of the various networks in another article. For now, let's discuss a more basic issue that's at the heart of much confusion and contention about sizes: What is the Internet, anyway?

Starting At The Center

For real confusion, start trying to get agreement on what is part of the Internet: NSFNET? CIX? Your company's internal network? Prodigy? FidoNet? The mainframe in accounting?

Some people would include all of the above, and perhaps even consider excluding anything politically incorrect. Others have cast doubts on each of the above.

Let's start someplace that almost everyone would agree is on the Internet. Take RIPE, for example. The acronym stands for European IP Networks. RIPE is a coordinating group for IP networking in Europe. (IP is the Internet protocol, which is the basis of the Internet. IP has a suite of associated protocols, including the Transmission Control Protocol, or TCP; the name IP, or sometimes TCP/IP, is often used to refer to the whole protocol suite.) RIPE's computers are physically located in Amsterdam. Its important feature, for our purposes, is that you can reach RIPE (usually by using its domain, ripe.net) from just about anywhere anyone would agree is on the Internet.

Reach it with what? Well, just about any service anyone would agree is related to the Internet. RIPE has a WWW (World Wide Web) server, a Gopher server, and an anonymous FTP server. So they provide documents and other resources by hypertext, menu browsing, and file retrieval. Their personnel use client programs such as Mosaic and Lynx to access other people's servers, too, so RIPE is both a distributor and a consumer of resources via WWW, Gopher, and FTP. They support TELNET interfaces to some of their services, and of course they can TELNET out and log in remotely anywhere they have personal login accounts, or where someone else has an anonymous TELNET service, such as a library catalog, available. They also have electronic mail, they run some mailing lists, and some of their people read and post news articles to USENET newsgroups.

WWW, Gopher, FTP, TELNET, mail, lists, and news: that's a pretty characteristic set of major Internet services. There are many more obscure Internet services, but it's pretty safe to say that an organization like RIPE that is reachable with all these services is on the Internet.

Reachable from where? Russia first connected to the Internet in 1992. For a while it was reachable from networks in the Commercial Internet Exchange (CIX) and from various other networks, but not from NSFNET, the US National Science Foundation network. At the time, some people considered NSFNET so important that they didn't count Russia as reachable because it wasn't accessible through NSFNET. Since there are now several other backbone networks in the US as fast (T3 or 45Mbps) as NSFNET, and routing through NSFNET isn't very restricted anymore, few people would make that distinction anymore. Besides, the Internet connects more than eighty countries, and Russia is now adding hosts to the Internet faster than almost any other country. So for the moment let's just say reachable through NSFNET or CIX networks, and get back to services.

Looking At Firewalls

A network that is owned and operated by a company in support of its own operations is called an enterprise network. One that uses the Internet Protocol (IP) is an enterprise IP network. Many of these are integrated into the Internet like any other IP network. However, many are deliberately firewalled so that their users can get to servers like those at ripe.net, but nobody outside the company network can get to company hosts. A user of such a network can thus use WWW, Gopher, FTP, and TELNET, but cannot supply resources through these protocols to people outside the company.

For purposes of this distinction between suppliers and consumers, it doesn't matter whether the hosts behind the firewall access servers beyond the firewall from their own IP addresses, or whether they use proxy application gateways (such as SOCKS) at the firewall. In either case, they can use outside services, but cannot supply them.

So for services such as WWW, Gopher, FTP, and TELNET, we can draw a useful distinction between supplier or distributor computers, such as those at ripe.net, and consumer computers, such as those inside firewalled enterprise IP networks.

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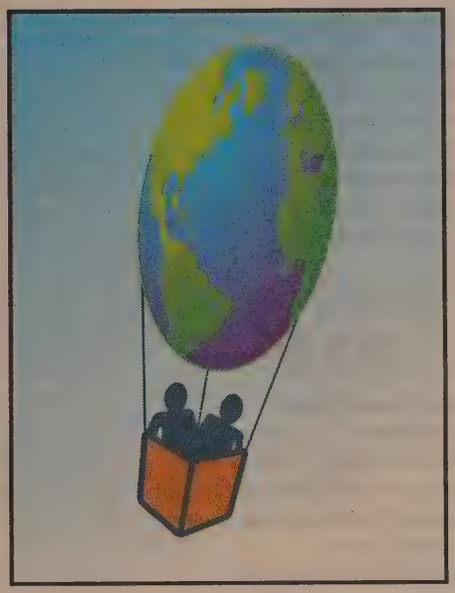

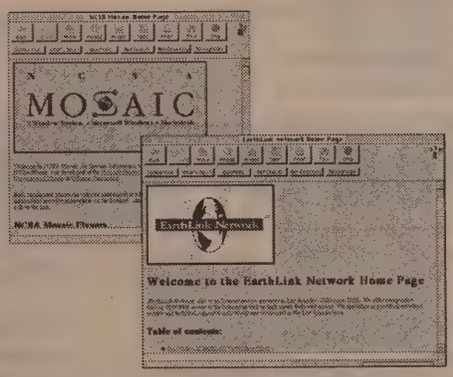

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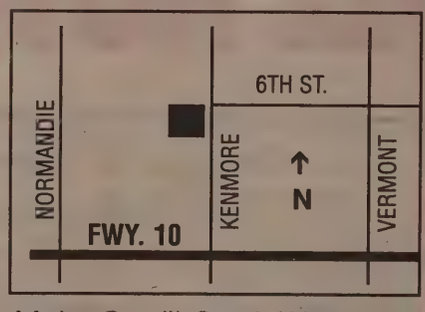

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It might seem more obvious to say producer computers and consumer computers, since those would be more clearly paired terms. However, the information distributed by a supplier computer isn't necessarily produced on that computer, or within its parent organization. In fact, most of the information on the bigger FTP archive servers is produced elsewhere. So we choose to say distributors and consumers. Stores and shoppers would work about as well, if you prefer.

Even more useful may be a distinction between supplier-capable computers (not firewalled) and consumer-capable computers (firewalled). A computer that is not supplying information right now may be capable of doing so as soon as someone puts information on it and tells the machine to start supplying that information. That is, setting up a WWW, Gopher, or FTP server isn't very difficult; much less difficult than getting corporate permission to breach a firewall. Similarly, a computer may not be able to retrieve resources by WWW or Gopher at the moment, since client programs for those services usually don't come with the computer or its basic software, but almost any computer can be made capable of doing so by adding some software. In both cases, once you've got the basic IP network connection, adding capabilities for specific services is relatively easy.

The Core Internet And The Consumer Internet

Let's call the non-firewalled computers the core Internet, and the core plus the consumer-capable computers the consumer Internet. Some people have referred to these two categories as the Backbone Internet and the Internet Web. We find people often confuse "Backbone" with NSFNET or some other specific IP network, and people often confuse "Web" with the World Wide Web (WWW) protocol, so we prefer core Internet and consumer Internet.

The core Internet is readily discernible technically as all the hosts that are reachable with ICMP ECHO (ping). The consumer Internet is harder to see because many of its hosts are behind firewalls.

It's true that many companies with firewalls have one or two computers carefully placed at the firewall so that they can serve resources. Company employees may be able to place resources on these servers, but they can't serve resources directly from their own computers. It's rather like having to reserve space on a single company delivery truck, instead of owning one yourself. If you're talking about companies, yes, the company is thus fully on the core Internet, yet its users aren't as fully on the Internet as users not behind a firewall.

If you're just interested in computers that can distribute information (maybe you're selling server software), that's a much smaller Internet than if you're interested in all the computers that can retrieve such information for their users (maybe you have information you want to distribute).

A few years ago it probably wouldn't have been hard to get agreement that firewalled company networks were a different kind of thing than the Internet itself. Nowadays,

Continued on page 239

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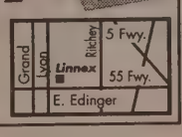

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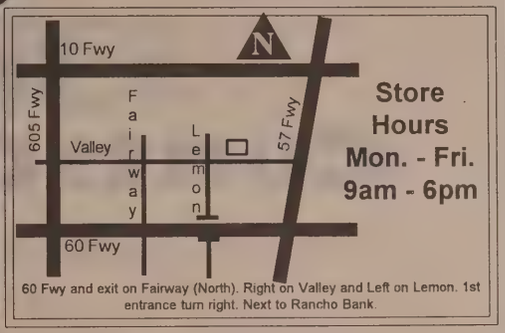

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Inventory Control And Beyond

Bar-Coding Systems For Any Size Business

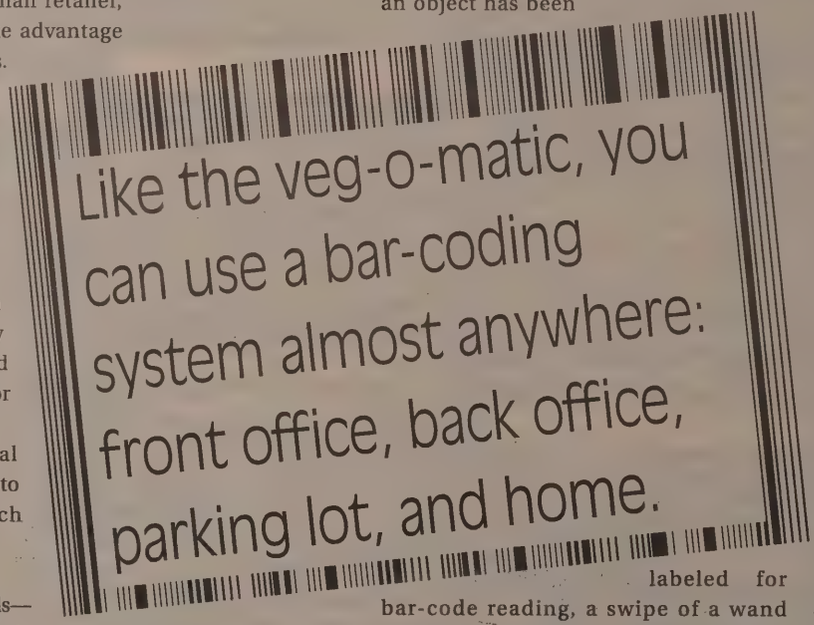
If counting, sorting, and tracking aren't what you most enjoy about your business operations, a bar-code system may be the answer. In days of yore, scanners and bar codes were principally the domain of supermarket check-out counters and national wholesalers with mega warehouse facilities. Nowadays, a couple hundred bucks and a laser printer will get you a basic system. The simplicity and low cost of admission opens the door for any service organization, small retailer, or professional office to take advantage of a host of nifty applications.

Traditionally, bar-code scanners have been used to track stuff in and out—freight cars, sardine tins, Rolaids. But a bar-coding system is a virtual veg-o-matic of inventory control, slicing and dicing through paperwork in short order. Any task involving storage and identification is a candidate for this contraption.

In addition to traditional inventory functions (we'll get to those later), consider such applications as the following:

- Locating client files.
- Maintaining library records—monitoring who's borrowed books or reference materials.
- Categorizing the contents of floppy disks.
- Tracking workpapers and report production; e.g., a consultant following the progress of a report or a law firm managing documents.
- Fixed asset (property and equipment) accounting, where bar-coding reduces the time otherwise required to enter and verify serial numbers.

The imagination runs wild! As the list of applications grows, many service providers and other businesses who don't traditionally keep inventories are finding creative ways to configure this simple technology.



Like the veg-o-matic, you can use a bar-coding system almost anywhere: front office, back office, parking lot, and home.

System Basics

Bar-coding is basically a system of encoding an identification number, optically reading it, and electronically inputting it directly into any number of databases. Its primary application is to keep inventory records up-to-date—informing management of what's in stock, what needs reordering, and how much it costs. Once an object has been labeled for bar-code reading, a swipe of a wand insures that widget gets located, bought, sold, loaned, stolen, consumed, evaluated, moved, redefined, or recoded in the appropriate records and reports.

Once in place, system operation yields enormous time savings. But like any form of database manipulation, setup can require a burdensome investment. The place to splurge with a bar-coding system is in the thinking, planning, and design stage.

Ample consideration should be given to what information will need to be encoded. Examples include an item's cost, description, purchase date, and lot number. Every item you want to track requires its own bar-code label; in some cases, more than one label will be desirable, so plan well. It can be inefficient and demoralizing to redesign the format after you've already entered all the data.

Reading Between The Lines

Software for printing bar codes can be surprisingly simple. For entry-level systems, Wynston Technologies, Inc., sells their complete Bar Code Kit, including software and hardware for coding, reading, and database management, all for $299 list. SCAN-ONE, by Vertical Technologies, is designed for use with portable computers ($219).

For software only, one popular low-end package is Bars and Stripes, by Tippecanoe Systems, Inc. ($99), which requires Microsoft Word for Windows or WordPerfect for Windows. The software converts data files created by the word-processor into a variety of label formats, such as file folder labels and address labels.

More powerful software packages allow for greater control over printing and graphics capabilities.

Another feature to look for is database compatibility. For example, Tippecanoe Systems, Inc., also offers software that can read information from dBase and other formats and convert data directly into bar-code labels ($149 or $299, depending on the version). If you have an existing database generated by a popular database program, you should be able to readily print bar-code labels by selecting appropriate software.

For businesses keeping inventory records as part of their regular accounting, the selection of an accounting software package is particularly important. Lower-end accounting software generally has only limited inventory capabilities. Although you may be able to import and export data to run in conjunction with a bar-code system, it can be awkward to do so.

Continued on page 90

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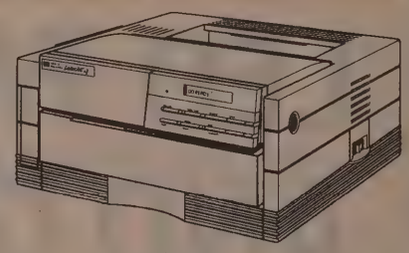

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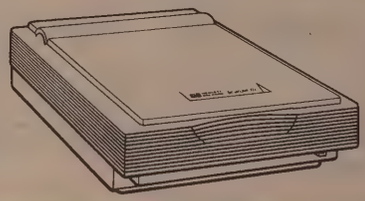

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Accounting *continued from page 86*

Most high-end accounting software, on the other hand, fully supports bar-code systems. MAS 90/Evolution/2 from State of the Art, Inc., for example, has complete decoding and label-printing capabilities built into its inventory accounting modules.

RealWorld, another high-end system, does not directly feature these capabilities in its main inventory modules. Instead, RealWorld Corp. sells Synchronics Inventory Plus, which integrates with RealWorld's inventory module to provide bar-code capabilities.

AccPac Plus, by Computer Associates International, Inc., also offers advanced bar-code capabilities, but only in conjunction with third-party add-on software. ScanPAC, by Symbol Technologies, enables AccPac Plus inventory modules to provide a high degree of flexibility in the coding process. A single item can be tagged with multiple bar codes, so items can be identified by part number, Universal Product Code (UPC), and so forth. Because large retailers often require their suppliers to provide convertible bar-coded goods and shipping documents, ScanPAC is designed for retailer approval.

Macola, Inc. offers a high-end accounting package targeted mainly to manufacturers. It features a bar-coding add-on that imports inventory transactions remotely with a portable data storage unit. Even non-manufacturers whose inventory is warehoused at an off-site location may find this feature useful.

Beware of off-brand accounting software tossed in with the scanner to create a package deal. Accounting software isn't a commodity that works great for everyone straight from the box. Handling the data is an accounting function requiring a degree of sophistication not likely to be found in a freebie or thoughtlessly bundled package.

Beam It Up

There are three types of hand-held scanners. The least expensive look like a pen and emit an ordinary beam of light. The disadvantage of these devices is that, due to the quality of light source, they too often don't read the label after a single swipe, and they need to be held directly against the bar code.

The next step up, in both price and ease-of-use, are charged coupled devices (CCDs). CCDs are more sensitive than ordinary light beams. They may therefore be held further away from the label and, for any given distance, are more likely to successfully read on the first pass.

The most pricey type are laser scanners, which have the highest sensitivity and therefore the greatest ease of use.

Inexpensive scanners rely on separate hardware or software decoders to recognize and translate the bar codes. The more sophisticated units, such as those at supermarkets, integrate the scanner and decoder so that the item can be simultaneously recorded and its description displayed at the point of sale.

To connect the scanner to a desktop computer, an expansion card is sometimes required. In other cases, the scanner can be plugged directly into a serial port.

Label Makers

To print bar-code labels, most users can simply use their laser printer with no more additional investment than the purchase of sheets of stickers. In some cases, your old dot-matrix printer can be resurrected and devoted to label printing. For others, it may be necessary to invest in a dedicated, high-quality, bar-code printer.

A poor-quality label requires a more expensive scanner to read it. With a cheap printer, several frustrating swipes might be needed before the label is decoded.

Other factors to consider are the label's size and adhesive ability.

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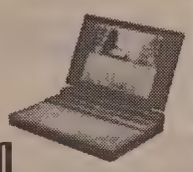

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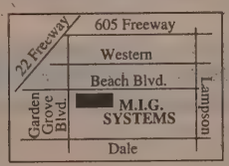

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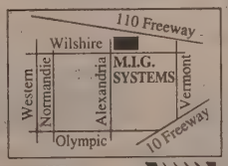

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Some labels are designed to track angels on the head of a pin, whereas large, easy-to-locate labels are desirable in other instances. If regular labels don't stick on your medium, you may need to use a fancy thermal transfer printer.

Getting The Right Recipe

Whether or not you use bar coding, selecting appropriate inventory software is a task unto itself. Shrink-wrapped inventory applications range from $49 cheapies to sophisticated works costing thousands. In making the selection, you'll need to consider not only managerial information requirements, but tax considerations as well. A review of your accounting practices should therefore be considered along with the bar code system enhancements.

In this regard, an important threshold, if you're a reseller, is if you gross at least $10 million dollars annually. At that income level, the complicated "uniform capitalization rules" may come into play, often requiring high-end software capable of supporting an elaborate system of cost allocations for tax purposes.

An overview of the latest inventory management software, from the household variety to high-end, as well as a guide to over a hundred vendors, is available in "Inventory Software, Keeping Track of the Pieces" in the February 1994 issue of *Accounting Technology.*

Reaping The Benefits

Because of the ready availability of additional inventory information, you may see opportunities to change your inventory accounting method to one that is more advantageous for tax purposes. Detailed analysis may reveal that adopting a particular method, which previously would have been too burdensome to employ, would now be practical.

With your added capabilities, for example, you might want to use the "specific identification" method, whereby each individual item is tracked for tax purposes, and deducted when sold. But without certain simplifying assumptions, inventory accounting, even on your new-fangled system, can quickly become a computational nightmare. The IRS therefore permits a vast variety of simplifying assumptions, with names like "chain-link dollar-value LIFO," for reporting cost of goods sold.

If you do make such changes, beware of IRS requirements. Before changing your method of accounting, you must generally obtain the consent of the IRS Commissioner. If you fail to do so, the IRS can retroactively disallow your change. Even if a tax year is closed beyond the statute of limitations, the IRS can open that old can of worms and, applying the less advantageous method back to the earliest open year, make a cumulative adjustment—read "headache."

Automated tracking can vastly improve the quality of your inventory management within a reasonable budget. Numerous management decisions depend upon the accuracy of sales and inventory information, and various economic models out there quantify optimal reorder points.

Unfortunately, smaller, inexperienced businesses often fall short of this objective because of inadequate equipment or planning. A junky system gets utilized less frequently than it could. Take a good look around at what's available and get professional management or accounting advice if you need it. With the right shopping and prep work, bar-code systems today provide a simple technology that can be taken advantage of by any business with inventory.■

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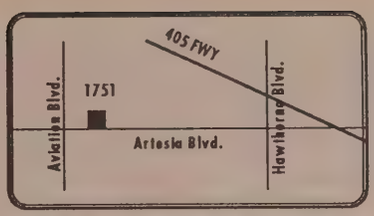

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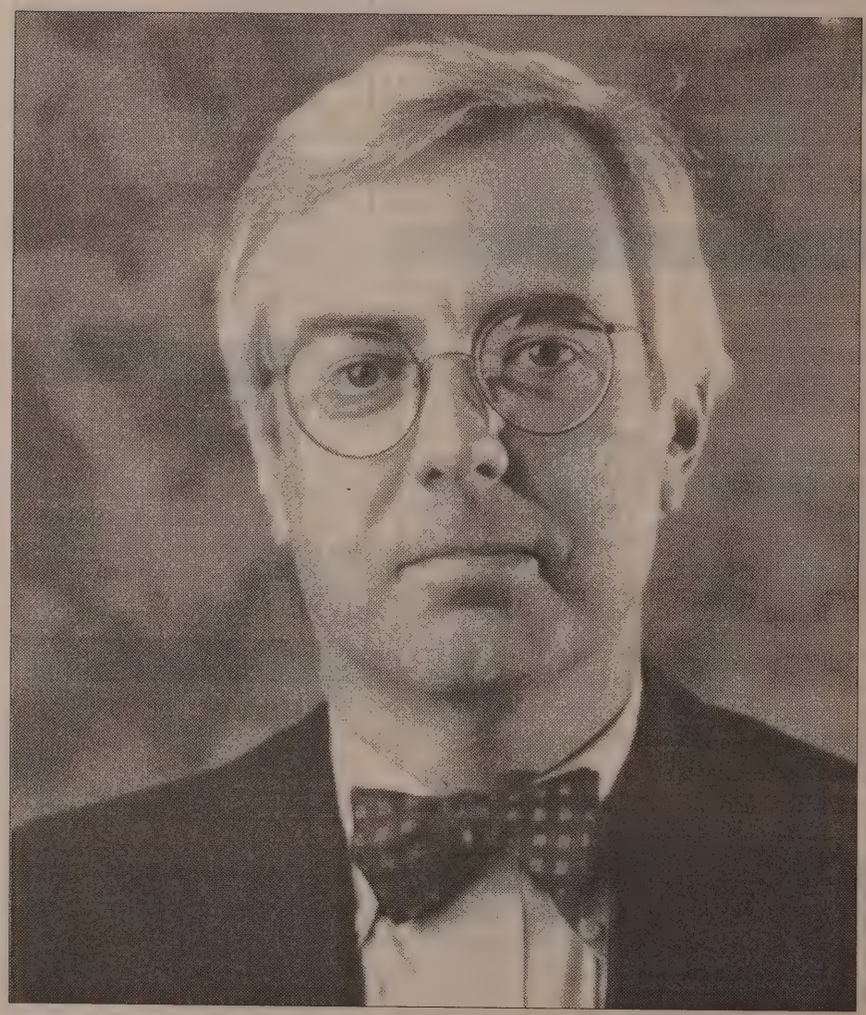

Technologic's Dick Shaffer Finds Bullish Venture Industry

By Mary Eisenhart

Scheduled for early December in Burlingame, Technologic Partners' Personal Computer Outlook conference celebrates its tenth anniversary this year, with panels looking into the next decade and the opportunities it presents to the technology investor. The premiere gathering place of venture capitalists and technology entrepreneurs, the conference has served to catalyze the high-tech industry from its inception.

When we checked in with founder and principal Dick Shaffer (interviewed last year in Issue #114), he confirmed reports that venture capitalists are more willing than in recent years to loosen the purse strings. He attributes this in part to a flurry of successful IPOs in the computer industry, suggesting a greater likelihood that VCs will reap attractive returns on their investment. "If it keeps up," he says, "1994 could actually equal or exceed the pace of 1983, which was the largest year for public offerings of technology stocks ever. What that means is that there are more people out there with a lust for red Ferraris who simply think they've got a great business idea, and more venture capitalists who believe them and will finance it.

"These are generally good times for the venture capital industry," he adds. "A number of firms have gotten out of the business; some partnerships have wound down, and some groups have decided not to raise additional money, as their better-known and more experienced partners decide to enjoy life a little more than they have. There are easier ways to make a living than venture capital, and many people have just chosen not to continue.

"That means that there are more, better deals for those who are still in the business."

Do you believe we'll have the problem we had in the '80s—lots of bad me-too deals getting funded?

I think it's almost always the case that we overdo it. It's a cyclical business, sort of a homeostasis process—you overshoot the mark, and then you undershoot it. That's what always happens in markets.

At the moment I think we're still rising slightly, although looking at the quality of some of the public offerings, we seem to be getting into a thinner phase. Institutional investors are being very selective about what they're willing to buy, which means that not every company that wants to go public can do so.

There's a disconnect of a few years between IPO markets and venture capital investment, because there's two to three, sometimes four years after a company's started before it's ready for sale to the public.

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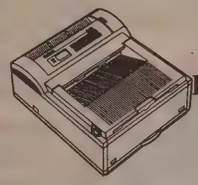

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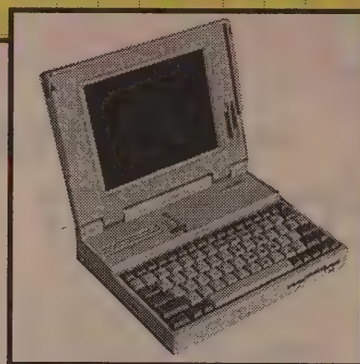

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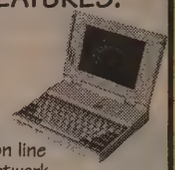

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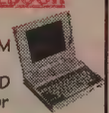

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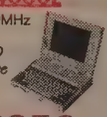

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I've heard more like seven or ten.

They don't like to talk about it, but yes, in fact that's true.

What kind of companies are looking attractive to investors? There seems to be a lot of mobile computing stuff, for instance.

Funding Sources: Search On Your PC

While there are no guarantees in the entrepreneur's world, seekers of funding will often find a valuable asset in Financing Sources Databank, a DOS-based software package from DataMerge (303/320-8361). The software, which also runs on Macs using SoftAT, is an extensive database of funding sources, venture capital among them. There's no substitute for personal contacts and networking, but this software can give the searcher a good place to start.

Users can search listings by a number of criteria—industry, geographical area, type of funding, amount of funding, and type of lender. Multiscreen profiles of matching lenders include detailed information as to the best way to approach the firm, the appropriate contact, the preferred level at which the firm likes to invest, etc.

The database is updated three times a year, and comes in two versions: Entrepreneur features over four thousand financing sources and costs $139; Professional ($499) includes over ten thousand financing sources and also includes mail merge, add/edit, label, and simple report printing functions.

—*ME*

There's a lot of mobile computing stuff going on, but some of the early companies in that area have found it very rough going. In fact several have gone kaput.

That's the way it is in early industries, especially industries where there's some infrastructure building to be done. If you think back to the early days of the PC, most of those companies are no longer with us. That's the way it is in this wireless area, the mobile area—most of the products out there are not complete solutions to problems.

There's not a large number of people willing to be pioneers and to be their own systems integrators. The market has been slower to take off than I think many people thought it would be. A great many people are convinced it's going to be an enormous market in the not-too-distant future, but the future's not quite here yet.

There's still a fair amount of activity in the mobile market—communications services, communications products of a variety of sorts. Mobility, networking, and consumer are three of the hot growth areas, we feel, for the next many years.

Why is the consumer market real all of a sudden?

There seem now to be machines that can run compelling software, and there are a large number of machines owned by consumers. And depending on whose numbers you believe, somewhere between a quarter and a third of households with children have a PC of some sort. There are an enormous number of titles, thousands, coming out on CDs. Most of them are junk, but a few are good.

What we ought to focus on, and what I think people are beginning to focus on, is the fact that a few are good. Most books are destined for the remainder table. Most records don't go gold, much less platinum; they just sit and gather dust. And so most CDs for the consumer market won't be big hits, but it doesn't cost a lot to turn one out—a million dollars, maybe $500,000. Some can do it for less.

So I think we're at the beginning of content that is really worth having, that in a few cases is actually better than the medium for which it substitutes. That's what you have to have. If a movie was only a recorded play, it wouldn't have amounted to the industry it now does.

The style has to adapt to the new medium.

Exactly. That's beginning to happen. At the moment a lot of the stuff is experimental, style for technology's sake. But we'll get beyond that.

Do you think the Internet explosion is going to have an effect on the venture community?

The venture community has been very slow to get into the Internet area, because it's been hard to figure out how you could make money at that, how you could build a protectable investment. If the network is essentially free, or perceived to be free, and if the connection or the interface—Mosaic, for example—is widely available, how do you build a protectable long-term advantage in that area? Unless you can do that, you don't want to invest any money.

In addition, the Internet culture prides itself on being hostile to commercial ventures, even though it really isn't—it's a different style. I believe that it will evolve to being much more commercialized, but at the moment, venture capitalists, with a few exceptions, have not put a lot of money into the Internet area. I believe UUnet, for example, has some venture capital investment, and Mosaic Communications.

Mosaic's reader has been very well received.

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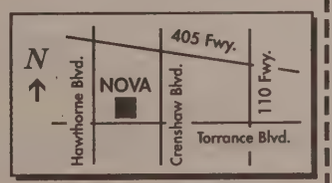

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Good Times For VCs *continued...*

licly available Mosaic in order to get people to use it, and then you'll have to improve on that to get people to pay for it.

Well, their model seems to be that they're going to give away the client software indefinitely and make money on the server software. But it seems that ultimately the plan is for the money to be made selling content, which is a boon to the crypto industry.

That seems to be the conventional wisdom, and I don't see any fault with it at the moment. If the most money is to be made in selling content, that's typically not a venture-financed business. Content is typically financed through limited partnerships or through loans.

On the other hand, you see companies like Paramount starting their own VC firms.

They are starting their own venture funds, and they are financing a few things like Paramount Technologies, but if the content business bears any resemblance to print media, broadcast media, film, and theater, all of which are well-established predecessors, it won't be venture-financed. Theater, for example, is financed typically through limited partnerships. And so is film, or film is financed through production agreements—the distributor lends the money to the producer in exchange for the right to distribute the film.

It's a perfectly viable way to do it, it just isn't venture capital.

How much interest do you see from VCs on things that are farther out on the horizon, like some of the more advanced biotech things, and nanotechnology?

I see interest, but almost no investment.

There is biotechnology investing by some of the same firms that invest in information sciences, but not the same people, generally. At Kleiner Perkins, for example, John Doerr sort of shepherds the information science projects, whereas it's Brook Byers who does the life science projects.

Doerr and I had a conversation a few years ago about *Engines of Creation*, and some of the other nanotechnology books. It's an incredibly interesting area, but I don't see much investment in that field yet.

It seems quite far from commercialization as a product. There's some micromachining going on in the area of sensors, and in sensor applications it makes a lot of sense. But for one thing, sensors are not a very sexy business, and they're not a very big business. Unless micromachines and nanotechnology get beyond that into some of the more fantastic applications that have been envisioned, it's just not going to attract the kind of capital that comes when presented with huge opportunity.

Also it's a longer-term investment than most VCs are comfortable with.

Venture capitalists expect to have a product within a year or two. Finished and on the market. They need to know that the technology will work.

The most important question in a venture-financeable deal should be: "How big is the market for this? Is it really as big as we think?" And maybe the next most important question is: "Can this team really reach that market at a profitable cost?" We're years from knowing that about nanotechnology. (Technologic Partners, 212/696-9330.) ■

Continued on page 229

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Online And Wireless:

Netnews Via Satellite

BY JACK POWERS

Imagine getting an electronic newspaper thousands of pages in size, one that's updated continuously and isn't really on paper. The publisher is nowhere to be found—the whole thing is a group effort by people all over the world who work for free.

This is Usenet News, a.k.a. netnews. Today, there are several thousand topics under discussion, and the list grows longer every day. For people who are information junkies, reading and responding to netnews can be addictive, gobbling immense amounts of time. Others are satisfied with "skimming the cream" of material matching a few specialized interests.

For most, participating in netnews (a large fraction of readers are also contributors) means using a terminal or a personal computer somehow connected to a shared computer system, like those at a university or public-access UNIX service. Your netnews connection could be a commercial service like America Online, or a participating BBS. You don't join in the flow directly (that would be like drinking from a fire hose), you use the shared system as an information agent to show you the stuff you care about.

The economics of this arrangement are that a large number of users can share the cost of the shared system, resulting in a small cost per user. Storage is a big part of this cost, with over 1GB (1000MB, or the equivalent of 714 floppies) of text broadcast every one to two weeks. System operators deal with this quantity by limiting the number of newsgroups they carry and/or deleting material older than a few days (one week is a common compromise).

Much of the growth of the news network in recent years is from BBS operators, anxious to add material to attract new users (see the BBS listings in this publication.)

Delivery: Bypassing The Clogged Pipeline

Netnews has been traditionally sent between these shared "site" computers via dial-up calls—which are getting longer and longer as volume increases. More recently, it has also been distributed via Internet connections. The total flow is approaching an average of 100MB per day, more information than will fit on the disk drive of many laptop machines. A typical day's traffic is several times what can be transmitted with a slow modem in twenty-four hours. Often, sysops are forced (usually reluctantly, because censorship isn't popular) to pick and choose groups, just to avoid getting more and more behind.

Slightly over a year ago, Pagesat, a company in Palo Alto, introduced a combination of product and service which delivers netnews to site computers via satellite. Aimed at BBS operators and serious individual netnews consumers, it is simple and inexpensive enough to allow the delivery of netnews with very little delay to private or shared computers for which it would be impractical via more traditional routes.

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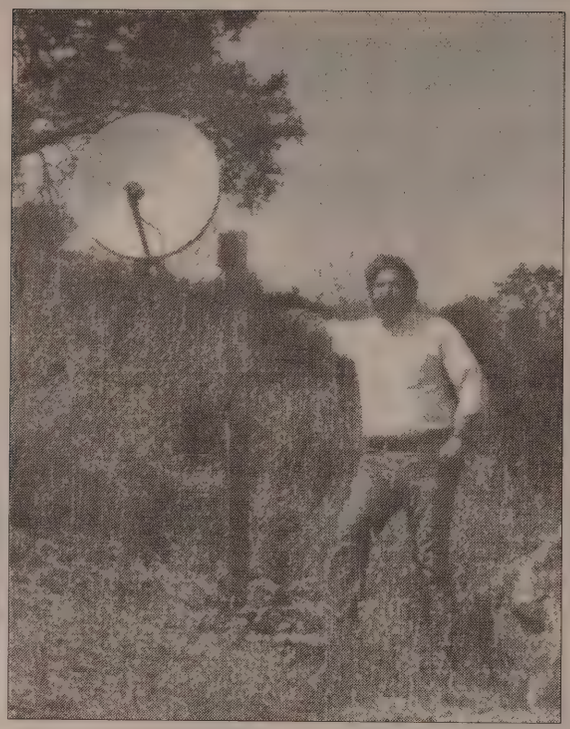

Photo: Lynn Wheeler and Dish

another site or via a direct Internet connection. The phone technique works great for sites within local calling distance of each other, using fast modems. The Internet technique is even better, but direct Internet connections are still relatively rare. For systems beyond a local call and lacking Internet, offering netnews can get very expensive very fast.

With the Pagesat system, you buy the receiving hardware and pay a fixed monthly charge to receive netnews twenty-four hours a day every day. The first year's monthly charges are included in the price of the receiver, which has been as low as $695 on sale. After that, it costs $30/month.

How It Works

Pagesat brings multiple Internet news feeds into Sun Microsystems computers at its Palo Alto headquarters, where it is assembled for satellite uplink at a dish farm in Mountain View. The system is designed to keep running in spite of hardware and link failures, even in combination.

A satellite called "K2," over 22,000 miles above the equator, relays the Ku-band signal back to the continental US and parts of southern Canada and northern Mexico. Over most of this area, only a very small receiving antenna is required; areas with much rain or snow may require a larger dish (up to 3') for reliable reception.

The receiver spits out an almost endless stream of text into the serial port of your computer. The data is regular ASCII, so you can watch it using a communications program like ProComm, but it flies by too fast to read—in order to grab and store the news you want, you'll need software designed for the purpose. Software packages are available for IBM PC-compatible (DOS or Windows) and UNIX systems. So far, Mac users are out of luck, but an old PC (only a 286 is required) can be had pretty cheaply these days.

The UNIX software support is supplied in "C" source form, and requires development tools for installation. Since details vary from one system to another, some adaptation may be required.

The System

The Pagesat system comes in three parts: dish, receiver, and power supply. Almost anyone can install it if directions are followed; it is much simpler (and smaller) than systems used for TV. Since the dish doesn't need to move after installation, there are no moving parts to get out of adjustment or fail.

A small (24.8" in diameter for most locations) receive-only dish mounts outdoors and a receiver that looks like a modem (which, among other things, it is) goes inside. The dish connects to the receiver with the same kind of coaxial cable used for TV, and the receiver

continued on page 234

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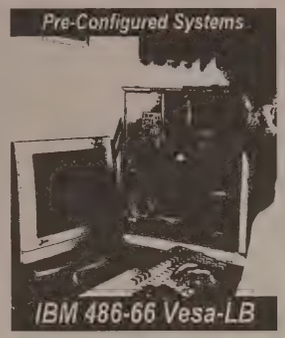

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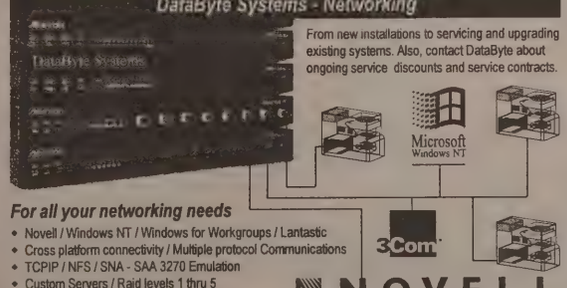

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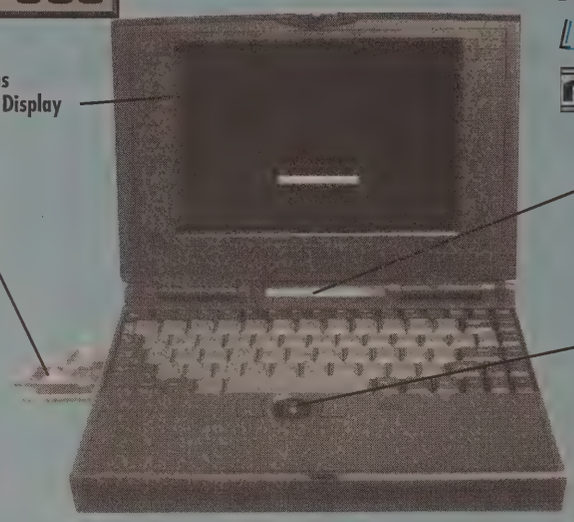

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Dual-Scan Color SoundBook

486SX-33 with 260Mb HDD	$1999
DX2-50 with 340Mb HDD	$2199
DX2-66 w/520Mb HDD & PCMCIA 14.4 S/R Fax Modem	$2499
DX4-75 with 340Mb HDD & 12Mb of RAM	$2799
DX4-100 with 520 Mb HDD & 12Mb of RAM	$2999
DX4-100 with 520Mb HDD, 12Mb of RAM, PCMCIA 14.4 S/R Fax Modem & PCMCIA Ethernet Adapter	$3299

Monochrome Book

486SX-33 with 260Mb HDD	$1495
DX2-50 with 340Mb HDD & 8Mb of RAM	$1799
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Multimedia Notebook

LOCAL-BUS

PCMCIA

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- Battery in use/Charging
- AC, DC and Low Battery Status
- HDD, FDD in use
- Caps Lock, Numbers Lock Scroll Lock
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16mm center micro track ball

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DX2-66 with 340Mb HDD & 8Mb of RAM	$3299
DX4-75 with 520Mb HDD & 12Mb of RAM	$3899
DX4-100 with 520Mb HDD, 12Mb of RAM & PCMCIA 14.4 S/R Fax Modem	$4299
DX4-100 with 520Mb HDD, 20Mb of RAM, PCMCIA 14.4 S/R Fax Modem	$4699
DX4-100 with 520Mb HDD, 20Mb of RAM, PCMCIA 14.4 S/R Fax Modem & PCMCIA Ethernet Adapter	$4799

*Mono Model Does Not Have Sound Chip Built-In

TROGON

- 4Mb RAM,120(200)Mb HD R
- 1.44Mb Floppy Drive
- 9.5" Mono LCD Passive 640 x 480, 64 gray
- Build-in Trackball Mouse
- 1 Serial, Parallel, Mouse, VGA, Keyboard Port
- 83-key keyboard
- Lightweight: 5.5lbs
- Demensions: 8.7" x 11.1" x 1

NOVACO

- 486 SLC/2-50 Mhz
- 4Mb RAM
- 1.44Mb Floppy Drive
- 120Mb Hard Disk (200)
- 2 PCMCIA Slot
- 9.5" Mono LCD Passive
- Trackball mouse
- 83 Keys Keyboard
- Weight: 5.7 lbs
- Dimension: 11" x 8.5" x 1.75"

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- Bubble Jet Printer Built-In
- Automatic Sheet Feeder Built-In
- PCMCIA - 2 Type II
- 10" LCD VGA Screen
- Canon 2-Button Hand Hold Trackball
- MS DOS 6.0, WINDOWS 3.1
- 7.7 Lbs. w/Bubble Jet Printer Inside
- One Year Road Side Service

Notejet	MONO	DSTN
486SX-33 4/120	$1577	$2029
486SX-33 4/200	$1940	$2471
NoteJet 2	**MONO**	**DSTN**
486SLC2-50 4/130	N/A	$2174
486SLC2-50 4/260	N/A	$2598

Canon Book 10 Sub Notebook

- Intel 486SL/33 MHz
- 4MB Up to 20MB RAM
- 512K VRAM
- Ext. 3.5" 1.44MB Floppy Drive
- 170MB Hard Disk (120 or 260MB)
- 8.5"/7.8" Mono/Du-Scan Display
- 1S, 1P, 1VGA, 1KB Port
- PCMCIA Type II Slot
- Bulit -in Track Ball Mouse
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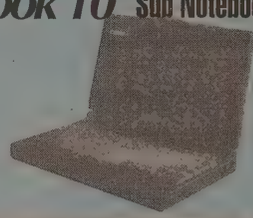
- DOS V6.21, Windows V3.11
- One Year Road Side Service



BOOK 10/C	MONO	DSTN
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486SX-33 4/260	$1395	$1769

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96/24 FAX/MODEM
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SCSI

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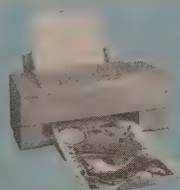

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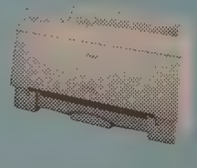
BJC-600 color
360 x 360 dpi
$479



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BJ-200e
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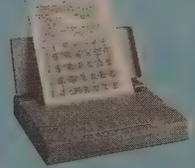

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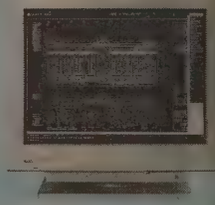

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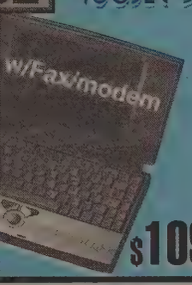

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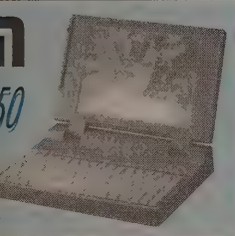

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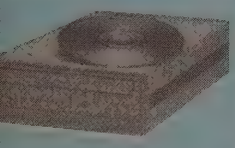

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- VESA Local Bus IDE/FDD Controller w/2S, 1P
- VESA Local Bus SVGA Card w/1MB
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- 101 Enhanced Keyboard
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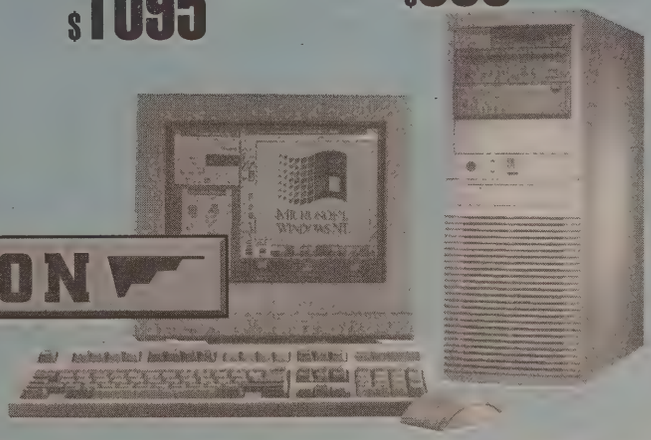

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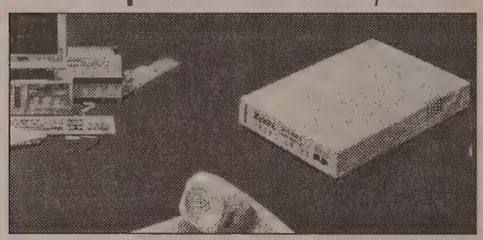

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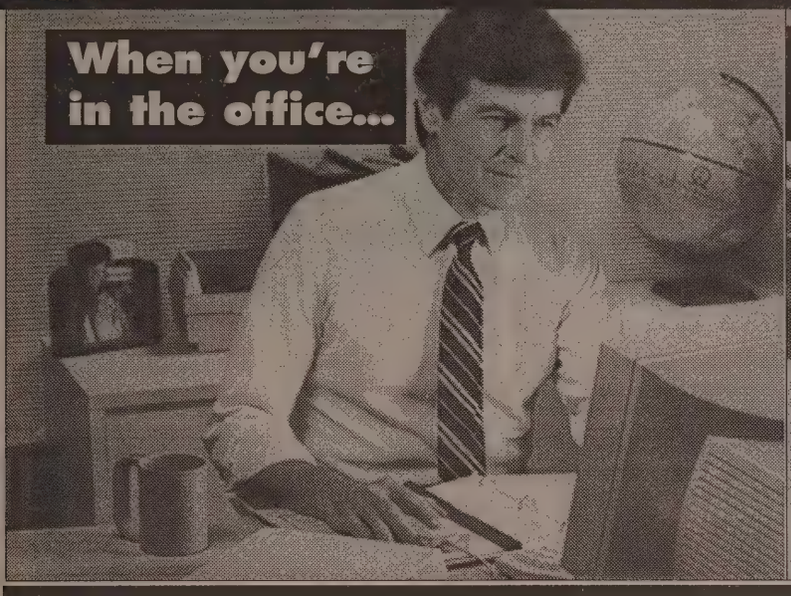

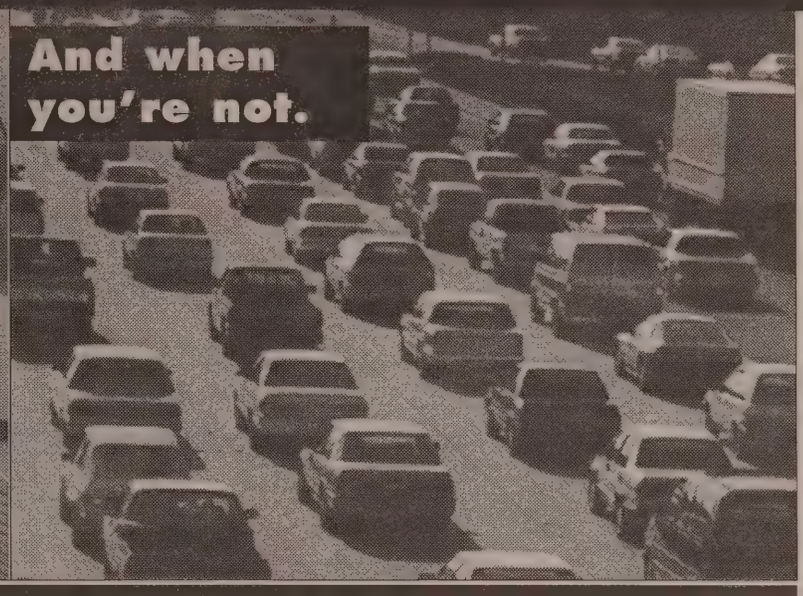

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PC Digest RATINGS REPORT — May 1993 — ZyXEL U-1496; ZyXEL U-1496E

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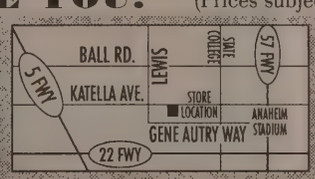

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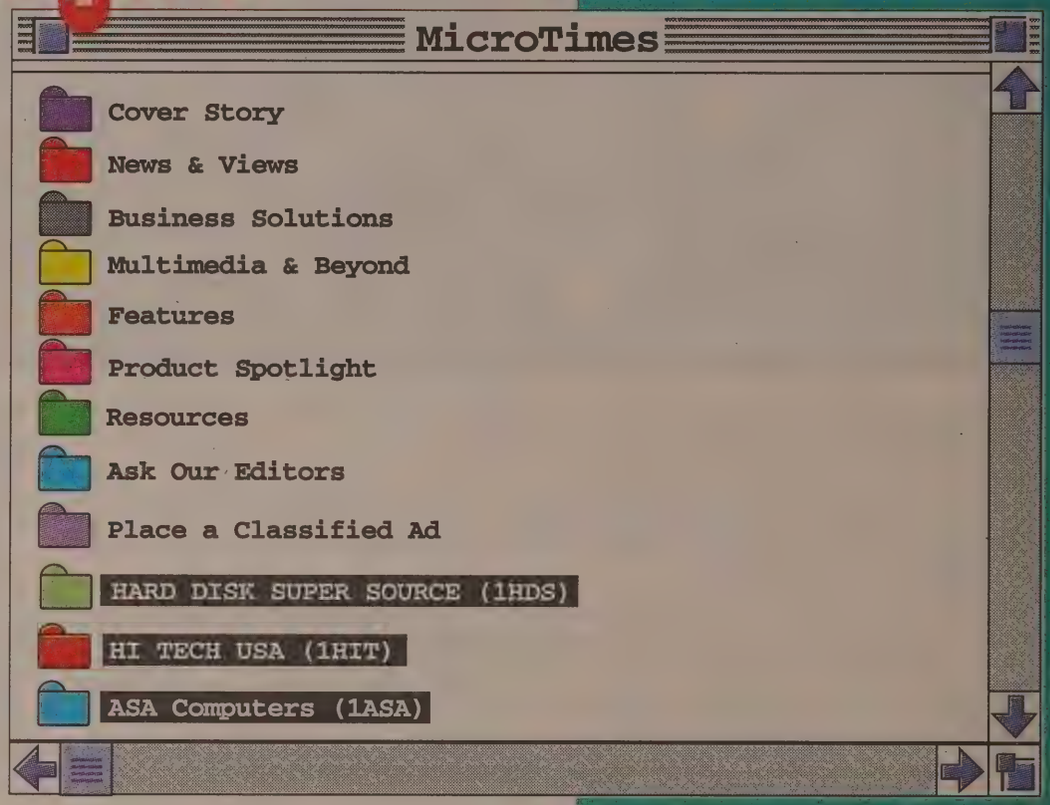

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Automated Fabrication: THE FUTURE OF MANUFACTURING?

Book By LA Author Explains Emerging Technology

By Todd Kaloudis

Welcome to the age of automated fabrication ("Autofab"), the computer-controlled generation of three-dimensional structures:

A photo polymer is an organic resin that solidifies (cures) under the influence of light. Photo polymer-based fabricators work by laying down a thin layer of resin and shining the proper wavelength of light on it in a pattern that describes the 2-dimensional shape of a single cross-section. [Then] a new layer of resin is applied and the process is completed. The previously formed layers recede to a greater depth in the resin vat. The final result, after the last layer is formed, is a solid object.

One thing that is particularly appealing, even astounding [about a particular method] is its ability to build composite mechanical structures with integrated moving parts—with no assembly [required].

—from **Automated Fabrication,** *by Marshall Burns*

In *Automated Fabrication,* the first book to present Autofab as a unified subject, Marshall Burns, a Ph.D. in physics, does a fantastic job of introducing and discussing this emerging group of technologies.

Automated Fabrication is divided into many sections with an assortment of topics. Primarily writing for managers and engineers in manufacturing, Dr. Burns covers the essential issues of surveying, purchasing, and using Autofab equipment. In addition, many chapters are dedicated to application of the technology and its impact on people.

Various types of additive and subtractive fabrication are compared for different applications. The latter process starts with a block of material and sculpts it to the desired specification. The former is more mysterious—as outlined in the introductory passage above, tiny bits of material are automatically assembled from scratch.

Individual subtractive and additive fabricator products are reviewed. Charts and tables focus on price, machine size, consumable materials, and general approach to fabrication. These approaches are discussed in detail—from selective sintering and stereo lithography to five-axis milling machines. The story of each unique product and invention is also told, including patent history.

Autofab, Current And Future

While current commercial fabricators are mainly for industrial prototyping or modeling tasks (for example, Chrysler uses stereo lithography equipment to generate plastic models for checking the fit of engine components), the machines of the future will have far more powerful applications. Manufacturers have already been successful in fabricating molds for prosthetics. Research is being done today on applying current Autofab techniques to steel molds, useful for high-volume production.

Even this is child's play, however, when compared with the long-term potential of fabrication technology. Nanofabricators may someday have the ability to assemble objects molecule by molecule.

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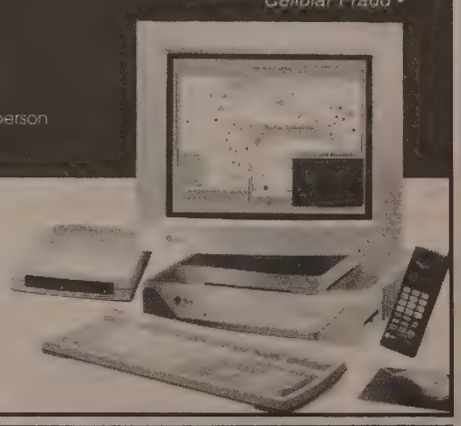

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At the end of the book, Burns even outlines the advantages of Autofab in space. The moon, for example, is lined with metallic dust. This, the author points out, could act as the "toner" for a fabricator's toner cartridge. Space colonization will be much easier if a large portion of "start-up" structures can be computer-generated on-site rather than transported by rocket.

What's Still Needed

When the cost of the necessary computer technology becomes cheaper, engineers and architects may be able to build useful things from their desktops. Scaled models could be generated quickly. Finished designs could be transmitted via telecommunications networks to far away (satellite?) fabrication sites.

So what's the holdup? Burns points to several areas which need refinement before the sci-fi machines of tomorrow become a reality.

Besides the obvious need for smaller, faster, cheaper computer parts, there is a great need for visualization tools and new investments. Better software will give the advanced user power over the parameters of 3-D production. Advances in virtual reality could make fabrication technology more accessible to people, as graphic user interfaces made "home computers" accessible in the 1980s.

When the cost of the necessary computer technology becomes cheaper, engineers and architects may be able to build useful things from their desktops.

There are vast opportunities for entrepreneurs: the author mentions operating software, materials, design distribution, and ancillary services, among others as possible areas for exploration.

This book is a "must-have" for people in manufacturing. Its detailed descriptions and discussions are essential reading if one is considering the purchase of fabrication equipment to increase productivity in the workplace. Most interesting to this reviewer, however, were the chapters on Autofab's bright future. Entrepreneurs and technology professionals take notice—Autofab is on its way! ■

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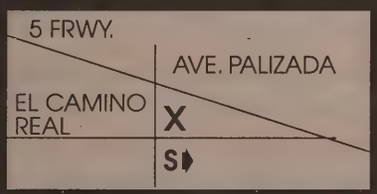

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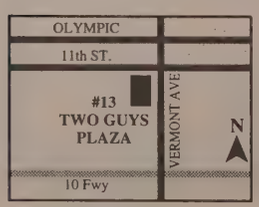

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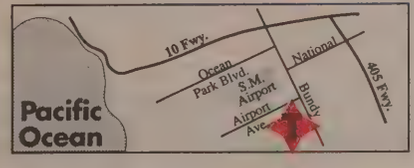

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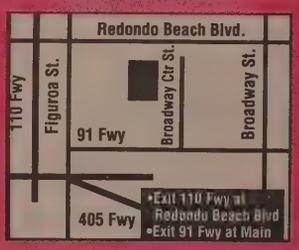

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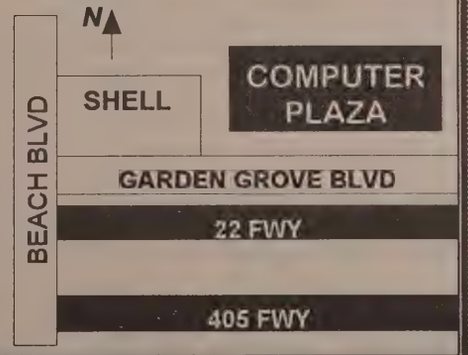

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* 101 Key Tronic Protouch Keyboard
* Hi-Resolution Mouse

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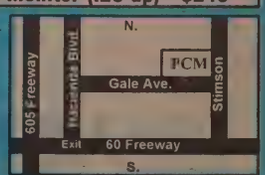

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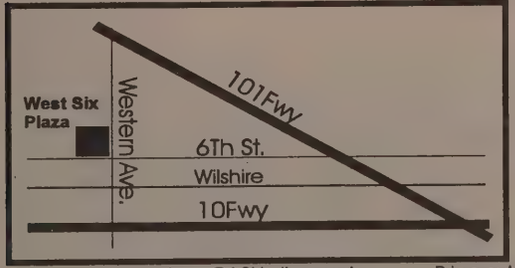

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Product Spotlight

UPDATES

• **ACI** announced that the **Power Macintosh versions of 4th Dimension, 4D Server, and 4D First will be free to existing customers.** ACI US, Inc., 20883 Stevens Creek Blvd., Cupertino, CA 95014. 1-800-384-0010.

• **Action Technologies** released **ActionWorkflow Manager for Lotus Notes v1.5**, targeted at individual users to deliver immediate workflow benefits out of the box. It is priced at $199 per user. Action Technologies, 1301 Marina Village Pkwy., Suite 100, Alameda, CA 94501. (510)521-6190.

• **Crosswise** is shipping **Face to Face v2.0**, the first cross-platform document conferencing software solution for both Windows and Macintosh users. It is available for $179 for the Windows or Macintosh version. Crosswise Corporation, 105 Locust St., Suite 301, Santa Cruz, CA 95060. (408)459-9060.

• **Data Description** released **Data Desk v4.2 Non-Transferable License**, a specially priced version of its data analysis software package designed for full-time students. It is available for $90 plus shipping upon submission of an application form and current student ID. Data Description, Inc., P.O. Box 4555, Ithaca, NY 14852. (607)257-1000.

• **Data Discovery** announced **v2.0 of TrueList**, its program for identifying and removing probable duplicate addresses from mailing lists. The price is $149. Data Discovery, Overland Park, KS. 1-800-808-3838.

• **Fractal Design** is shipping **Fractal Design Painter v3.0**, the latest version of its natural-media paint and image-editing program. It is available for Macintosh, Power Macintosh, and Windows for $499 retail; $149 for registered users of Painter 1.0, 1.2, and 2.0; and $99 for users of Painter X2. Fractal Design Corporation, 335 Spreckels Dr., Aptos, CA 95003. (408)688-5300.

• **Okidata** announced **DOC•IT Software Release 3.2**, which provides additional functionality and increased fax and printer performance. Upgrade kits are available to registered users free of charge through December 31, 1994. Okidata, 532 Fellowship Rd., Mount Laurel, NJ 08054. 1-800-OKI-TEAM, ext. S.

• **Ontrack** announced **Drive Rocket v1.14**, the newest version of its data accelerator for IDE hard disk drives. Current owners can upgrade for $19.95, retail price is $39.95. Ontrack Computer Systems, 6321 Bury Dr., Minneapolis, MN 55346. 1-800-752-1333.

• **Panacea** has released a **free update for all owners of its TurboDLD*Deluxe* v2.0** in the form of a utility that fixes several minor bugs and adds support for new graphics hardware. Panacea, Inc., Post Office Square, 24 Orchard View Dr., Londonderry, NH 03053-3351. 1-800-729-7420.

• **Shany** is shipping **AlertVIEW 2.3**, an upgrade to its software for automatically detecting, reporting, correcting, and preventing application problems. Shany, Inc., 1101 San Antonio Rd., Mountain View, CA 94043. (415)694-7410.

• **Softwarehouse** announced **Connection Manager v3.7**, an upgrade to its modem server package for IPX and NetBIOS networks. A Lite package is available for $195, and the standard version is $395. Softwarehouse Corporation, 326 State St., Los Altos, CA 94022. (415)949-0203.

• **Specular** is shipping **Specular Collage 2.0.** The new version has been optimized in many areas and is Power Macintosh native. It is available to registered users for $49, $399 retail. Customers who purchased Specular Collage 1.0 after July 20, 1994, can receive the upgrade free. Specular International, 479 West St., Amherst, MA 01002. 1-800-433-SPEC.

• **Xinet** released **v8 of its suite of file sharing and print server software for Macintosh and UNIX systems.** K-AShare, K-Spool, K-FS, and K-Talk allow Macs and UNIX workstations to share files and PostScript printers. Xinet, 2560 Ninth St., Suite 312, Berkeley, CA 94710. (510)845-0555.

New Products

Portables/PCMCIA

IBM ThinkPads

IBM has released new lines of its ThinkPad mobile computers: the ThinkPad 755 Series notebooks, the ThinkPad 360 Series notebooks, and the ThinkPad 730T Tablet. The 755 Series is offered with a choice of two color screens, a 10.4" TFT active-matrix or a 9.5" dual-scan passive-matrix; two processors, Intel's DX4-75/25MHz or DX2-50/25MHz; local bus video; parity memory; and an integrated microphone and speaker. The 360 Series comes with either an 8.4" TFT active-matrix color, a 9.5" dual-scan passive-matrix color (also available as a pen-based convertible model), or a monochrome screen; an Intel 486SX-33MHz CPU; and local bus video. Both series have an expandable 4MB of RAM; up to 540MB hard drives; and come preloaded with PC-DOS 6.3, Windows 3.1, America OnLine, cc: Mail, Lotus Organizer and ScreenCam, Official Airlines Guide FlightDisk, Prodigy, FaxWorks 3.0, and Co-Session. The 730T Tablet is a pen-based tablet designed for on-the-go, forms-based applications. It features a transflective screen, up to ten hours battery life, is preloaded with Pen for OS/2 or PenDOS and Windows for Pen Computing, and weighs 3.5lbs. All the ThinkPad models have Level 2.01 PCMCIA slots: the 755 and 360 notebooks are configured with a Type III slot, and the 730T offers either two Type III or three Type II slots. (Prices start at $3599 for the 755 Series, $1999 for the 360 Series, and $2569 for the 730T) IBM Personal Computer Co., Route 100, Somers, NY 10589. 1-800-426-2968.

Commax Smartbook III

The Smartbook III is the newest member of the Smartbook family of upgradable notebooks. It employs a 486 platform and is available as a 486DX-33, 486DX2-50, 486DX2-66, and 486DX4-100. All models feature detachable 9.5" screens in dual scan or active matrix color; 32-bit VESA Local Bus video with 1MB of video RAM; one Type II and one Type III PCMCIA slots and a Type IV expansion slot; built-in digi-

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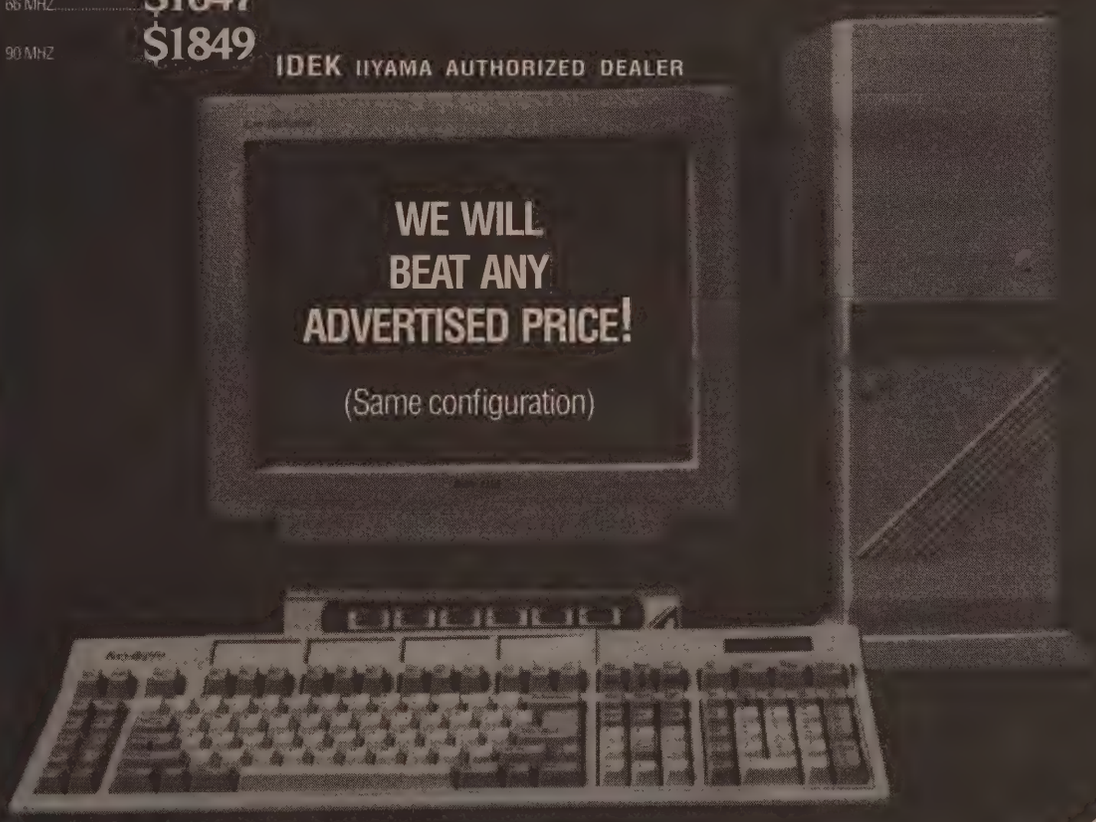

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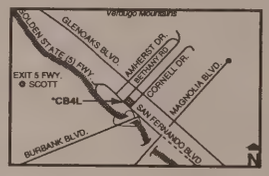

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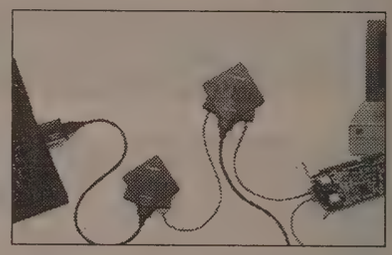
tal audio sound with record and play back via a built-in speaker, built-in microphone, and line-in/line-out jacks; a removable hard drive; and an ergonomic keyboard with a built-in track-ball surrounded by wrist rests. (The DX4-100 with dual scan monitor, 200MB hard drive, 4MB of RAM, IBM PC-DOS 6.3, Windows 3.11, and a carrying case starts at $2595) Commax Technologies, Inc., 2031 Concourse Dr., San Jose, CA 95131. (408)435-5000 or 1-800-526-6629.



Top to bottom: Farallon's EtherWave PCMCIA Adapter; Smart Modular Technologies' PCMCIA Voice/Fax Modem.

EtherWave PCMCIA Adapter

Farallon's EtherWave PCMCIA Adapter connects PC notebook computers directly to 10BaseT Ethernet networks. It enables notebook users to carry with them everything they need to connect to any 10BaseT Ethernet network at any location. Network managers can provide portable users with full 10Mbps access to network resources such as printers and servers without requiring a dedicated hub port connection. Each adapter includes a Type II PCMCIA adapter, a Farallon EtherWave connector, and a 4.5-meter length of category 3 unshielded twisted-pair cable. ($299) Farallon Computing, Inc., 2470 Mariner Square Loop, Alameda, CA 94501-1010. (510)814-5100.

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Smart Modular Technologies has added voice capabilities to its family of high-speed PCMCIA-based fax/data modems. The ST1414L supports an extended command set for voice applications, including voice mail, mailbox, and fax-back capabilities; microphone and speaker interfaces; use of a handset; and ADPCM and A-law compression. It features an ultra-low-power sleep mode and built-in DAA line interface circuits. It provides complete data and facsimile capabilities at 14,400bps with V.42

Continued on page 127

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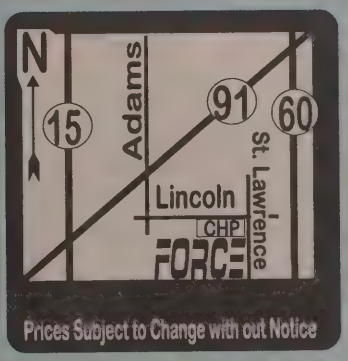

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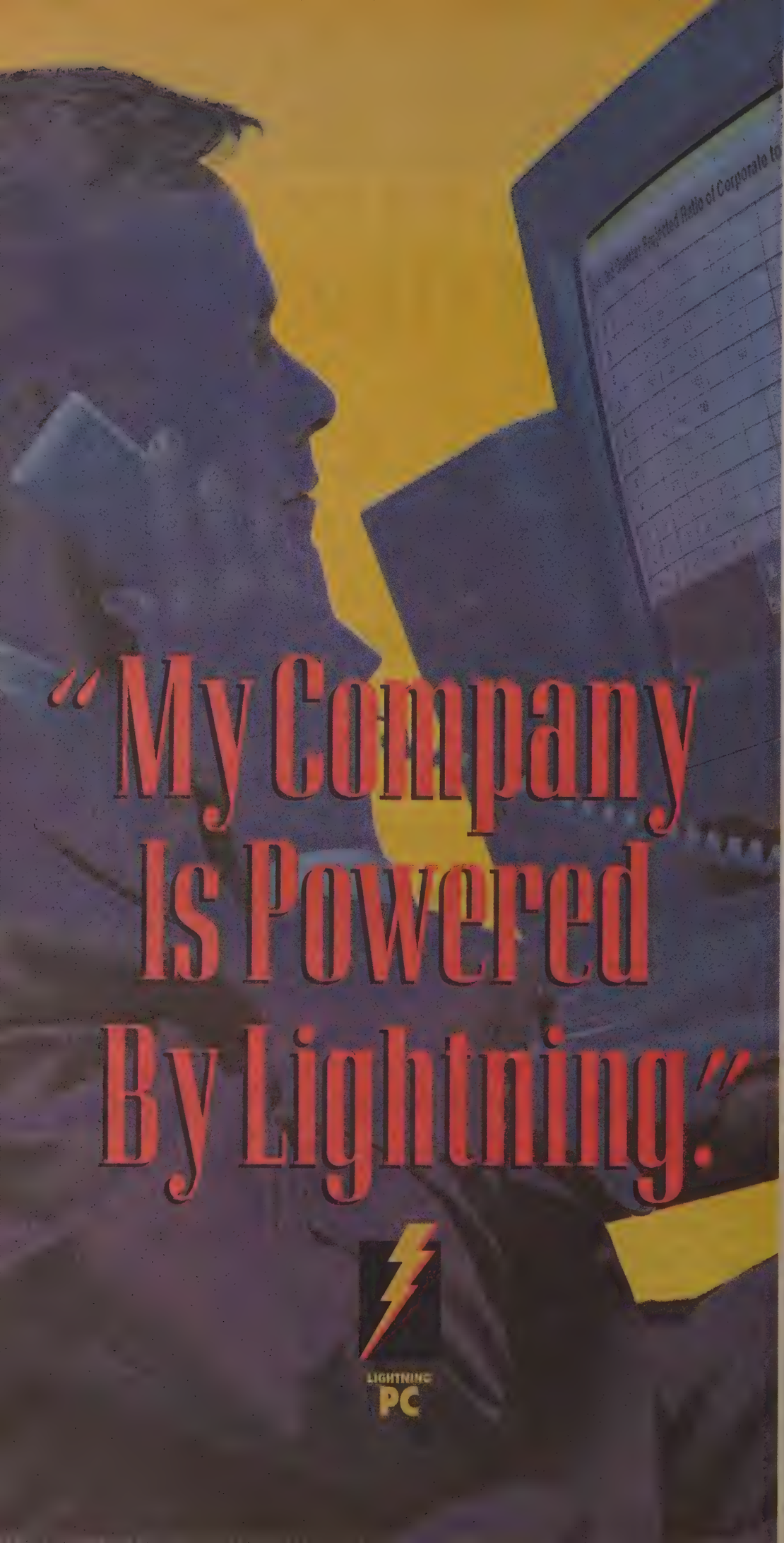

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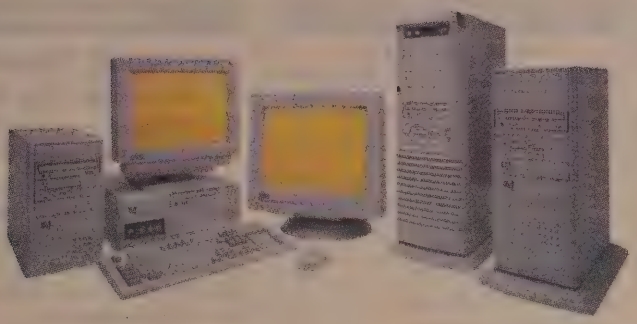

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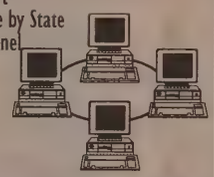

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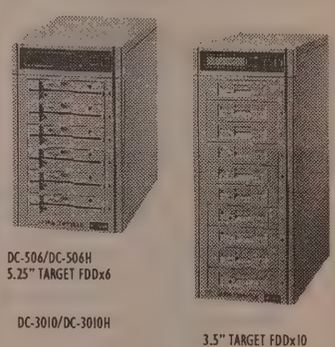

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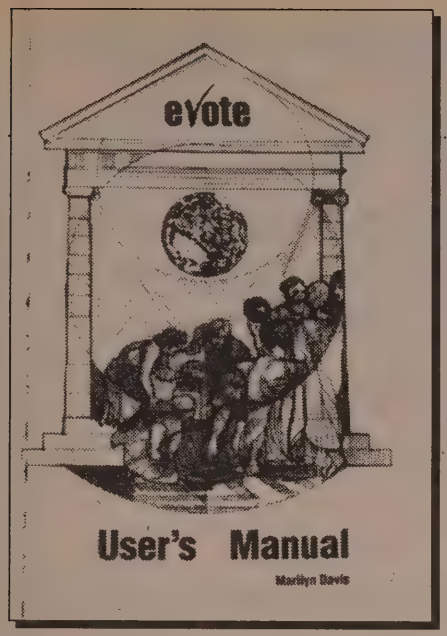

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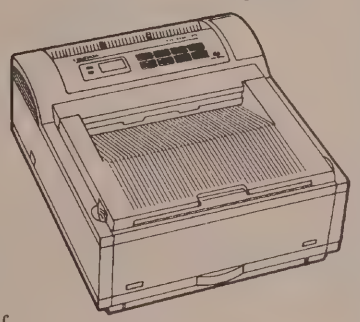

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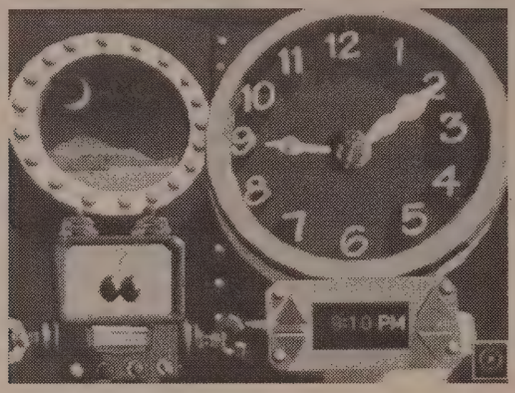

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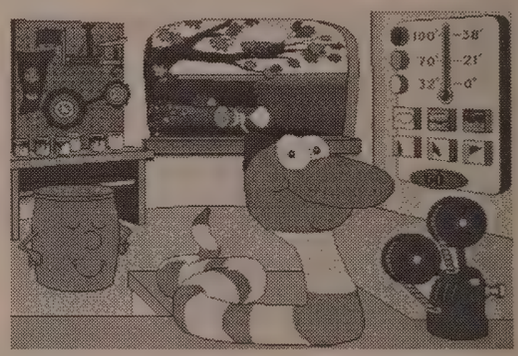

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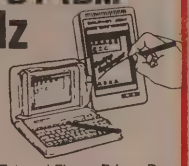

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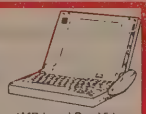

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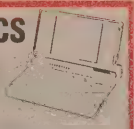

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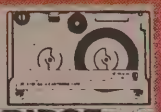

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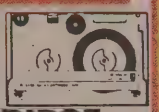

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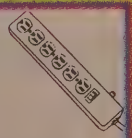

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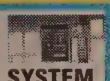

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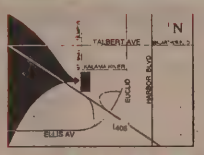

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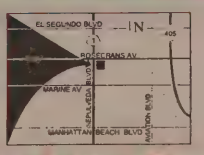

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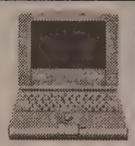

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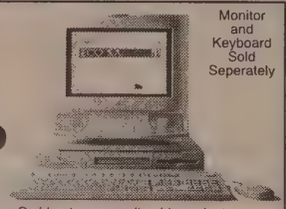

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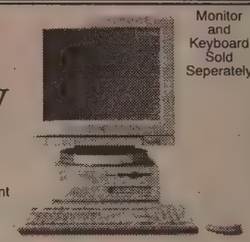

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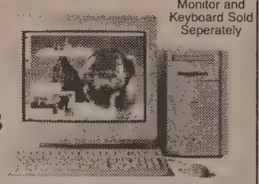

PowerPC 601 RISC processor; integrated math coprocessor and 256K memory cache• 80 megahertz speed • 2MB VRAM • Expansion slots for three NuBus expansion cards • Apple Desktop Bus™ Port Video input/output port • Standard monitor port • GeoPort™ • Telecommunication Capabilities • Built-in support for all Apple® displays and supports several third party VGA and SVGA displays. Built-in LocalTalk® and high-speed Ethernet connections; AppleTalk® networking software. • Power Macintosh™ will run DOS and Windows™ applications with SoftWindows™ by insignia Solutions

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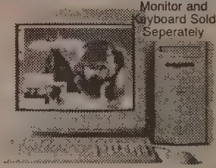

PowerPC 601 RISC processor; integrated math coprocessor and 256K memory cache• 80 megahertz speed • 2MB VRAM • Expansion slots for three NuBus expansion cards • Apple Desktop Bus™ Port Video input/output port • Standard monitor port • GeoPort™ • Telecommunication Capabilities • Built-in support for all Apple® displays and supports several third party VGA and SVGA displays. Built-in LocalTalk® and high-speed Ethernet connections; AppleTalk® networking software. • Power Macintosh™ will run DOS and Windows™ applications with SoftWindows™ by insignia Solutions

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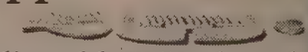

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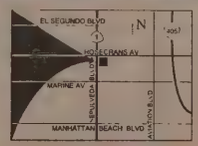

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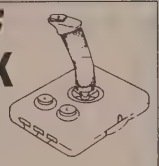

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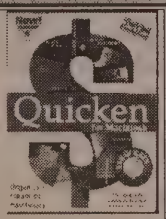

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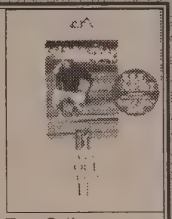

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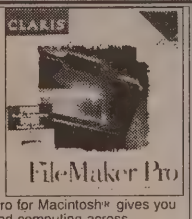

With more than 50 new features, FileMaker Pro for Macintosh® gives you even more for scripting, data management, and computing across workgroups.
And adds impact to your files with QuickTime movies!

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Microsoft® Office 4.2 Upgrade for Macintosh®

Special upgrade for users of Microsoft® Excel, Microsoft® Word, Microsoft® PowerPoint, Microsoft® Works, or Microsoft® Office 3.0 or Earlier

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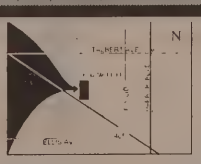

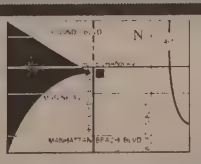

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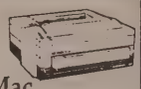
LaserJet 4ML Laser Printer for Mac



- 26 built-in scalable typefaces let you shrink and enlarge type to thousands of sizes.
- 300 dpi Laser printing with HP Resolution Enhancement Technology and microfine toner for smooth, sharp text and graphics.
- 1MB standard memory with Memory Enhancement Technology effectively doubles your printer memory.

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The BEST print quality in the industry

12 pages per minute printing for Macintosh and mixed Mac/Pc environments • True 600 dpi output • Adobe™ PostScript™ Level 2 and enhanced HP PCL 5 printer languages • 80 scalable typefaces - 35 Adobe Type1, 35 Intellifont, 10 TrueType™ • 6MB standard, expandable up to 38MB • 250 sheet paper tray and 10-envelope multipurpose tray

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Apple® LaserWriter Select® 310

The Apple® LaserWriter Select® 310 is the most affordable PostScript™ laser printer ever to come from Apple®, and is designed for personal use by both Macintosh® and Windows computer users. You'll appreciate the printer's speed. And with PostScript™ printing, you'll also get high-quality results and compatibility with all the major application programs.

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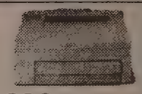
#1767784

Apple® Personal LaserWriter® 320



provides advanced print capabilities in Apple's most affordable Adobe™ PostScript laser printer. It's a fast, quiet, energy efficient printer that's ideal for home or office

Features include:

• 300 dpi • 16MHz Speed • 2MB RAM • 39 scalable fonts • 100-sheet paper tray • LocalTalk and high speed RS-422 Serial interfaces • Comes with a RISC processor so you can print at a quick 4ppm • Provides TrueType® and Adobe™ PostScript fonts in a range of typefaces.

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DeskWriter 320 Portable Printer

- Crisper, blacker blacks with 600 x 300 dpi printing plus HP's Resolution Enhancement Technology
- Compact, portable design fits nearly into a briefcase
- Easy-to-add color with an optional HP Color kit (sold separately) just snap in the cartridge and print

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DeskWriter 560C Color Inkjet Printer for Mac

Outstanding print quality in black and color. This clear, sharp,professional-quality with 600 x 300 dpi black output has HP's Resolution Enhancement Technology for smooth, crisp characters, fast text printing at 3 ppm for black and 4 mpp for color. 256 levels of grayscale Energy efficient.
Three year limited warranty.

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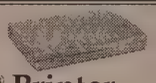
#1892468

Apple® Portable StyleWriter® Printer



The Apple® Portable StyleWriter® printer goes anywhere and everywhere with Apple® Macintosh® and PowerBook® computers. It delivers high-resolution output, and versatile paper handling, all with smooth, quiet performance. And it even fits inside a briefcase. The Portable StyleWriter® weighs only 4.5 pounds, and works with any PowerBook®, Apple® PowerBook Duo®, or Macintosh® computer, using a rechargeable battery or a standard power source. It can print in a horizontal or vertical position, so you can use it in even the most confined spaces, whether you need to print on letterhead, envelopes, labels, or transparencies

$379

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Apple® Color StyleWriter® Pro

is an ink-jet printer that provides high-quality color printing in a compact design. It is a versatile printer that's perfect for home or office use, since it lets you print your color files at your desk at about half the cost per page of other desktop color printers.The Color StyleWriter® Pro includes 64 scalable TrueType® fonts and yields a resolution of 360 dots per inch; ColorShare and ColorSync®.

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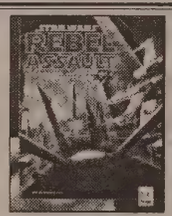
Rebel Assault CD-ROM for MACINTOSH®



The best CD-ROM game is now available for the Macintosh. Features Include:

- Astonishing 3-D Graphics
- Over a dozen action-packed levels
- Full screen video from the Star Wars movies
- Digitized Speech and movie sound effects.

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MAC CD-ROM
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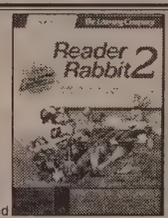
The Learning Company®

Reader Rabbit 2



Reader Rabbit 2 is designed to motivate first and second grade level children to read on their own as they build a foundation for successful reading.
It helps children with:
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Vowel Sounds,
Word Concepts,
Early Dictionary Skills

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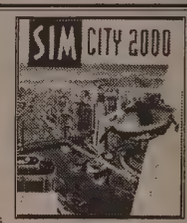
SIM CITY 2000



SIM CITY is primarily a "building game" where you create and try to increase the size of your cities. You can build small rural towns, or huge, bustling megalopolises.

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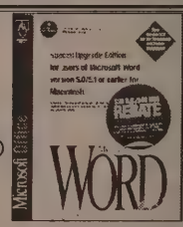
Microsoft® Word 6.0 Upgrade for MACINTOSH®



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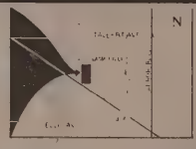

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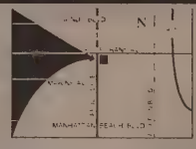

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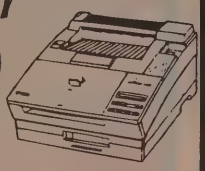

- Fast six pages per minute print speed.
- HP LaserJet III and Epson dot matrix compatible
- 27 resident fonts, 13 scalable
- 1MB memory expandable to 5MB
- 300 dpi resolution w/RIT
- Built-in parallel & serial interface
- 2-year limited warranty

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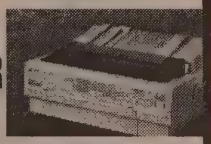
24 PIN PRINTER WITH SCALABLE FONTS!



- 80-Column
- 225 - 269 CPS Draft Mode
- 75 - 90 CPS Letter Quality
- Four Scalable Fonts
- 360 dpi with Optional Film Ribbon

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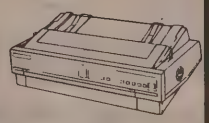

- 136-Column
- 10 Fonts
- 4 Scalable Fonts
- 225 - 269 CPS Draft Mode
- 75 - 90 CPS NLQ Mode

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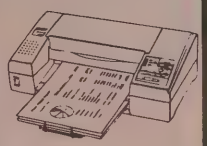
COLOR INKJET PRINTER



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- 24-wire color dot matrix printer
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- Built-in 50-page sheet feeder
- High quality color for home or office
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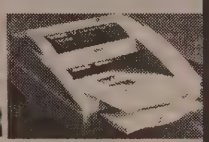

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- MS Windows driver included
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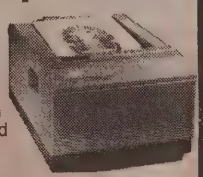

- 300 X 300 dots per inch
- Printer speed up to to 4 pages per minute
- Paper Types: Cutsheet, labels, transparencies and envelopes
- 2MB memory upgradable to 4MB
- 17 Adobe PostScript fonts, upgradable to 43 fonts.
- Serial/Parallel AppleTalk interfaces

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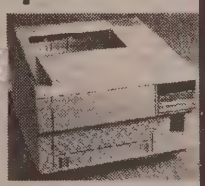
digital DEClaser 5100 PostScript Level 2

LASER PRINTER



- 600 X 600 dots per inch
- Printer speed up to to 8 pages per minute
- Adobe Level 2 PostScript with 73 Adobe fonts
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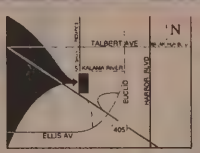

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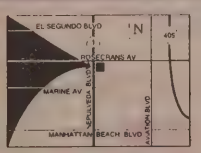

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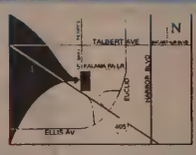

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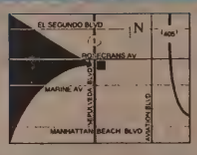

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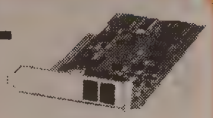

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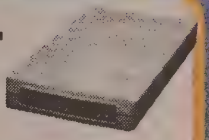

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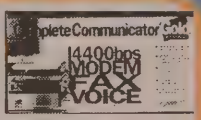

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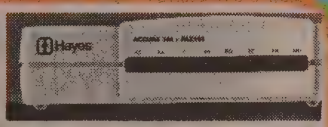

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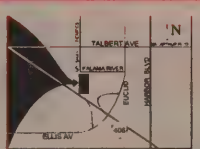

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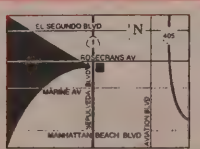

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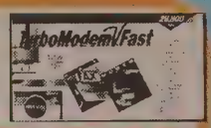

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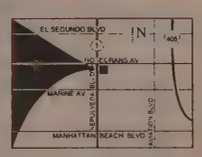

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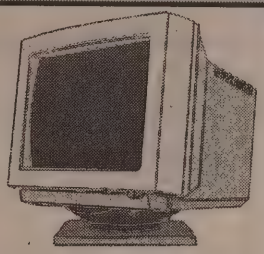

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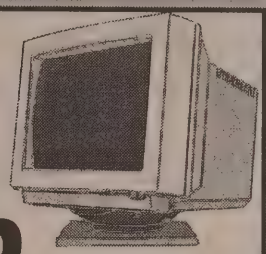

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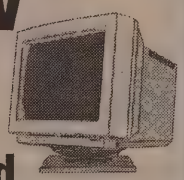

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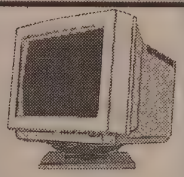

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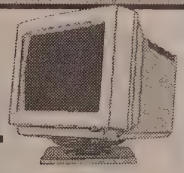

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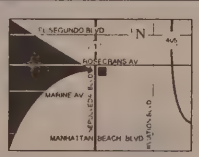

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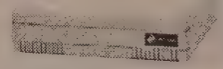

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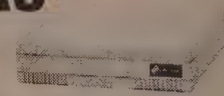

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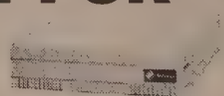

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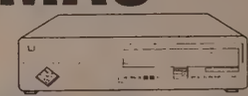

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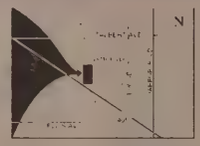

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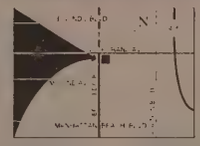

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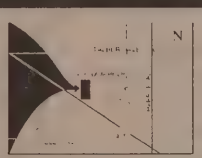

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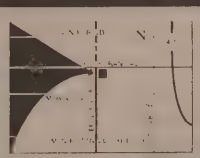

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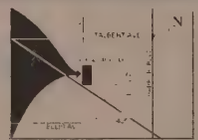

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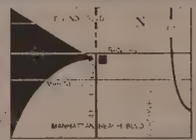

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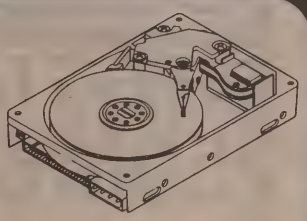

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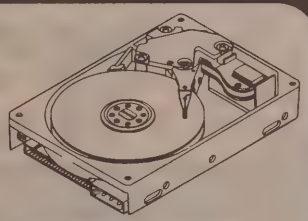

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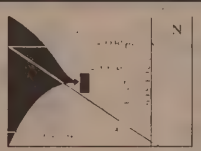

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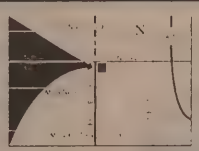

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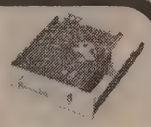

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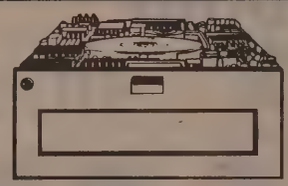

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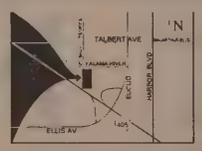

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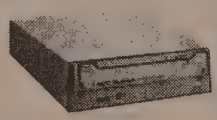

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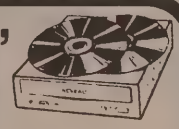

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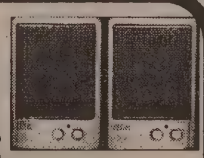

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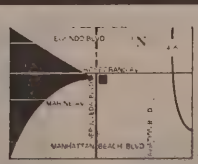

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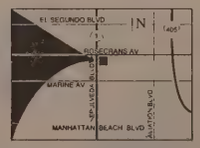

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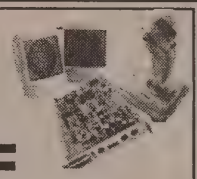

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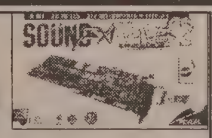

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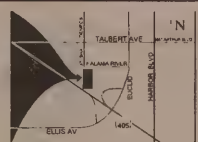

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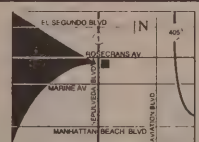

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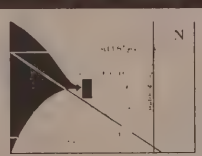

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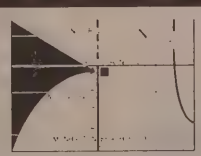

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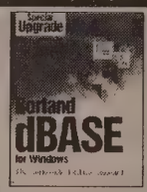

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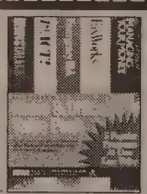

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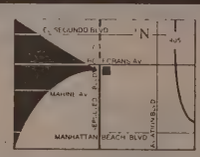

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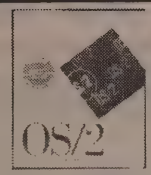

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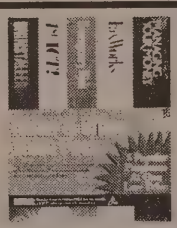

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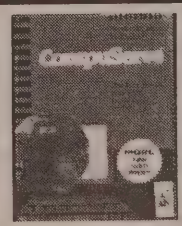

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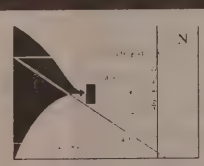

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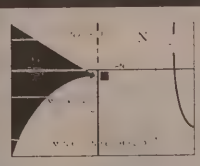

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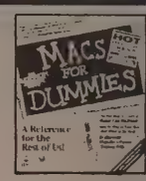

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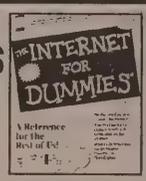

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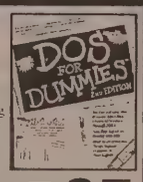

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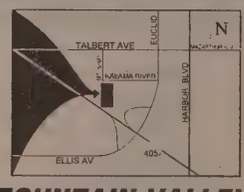

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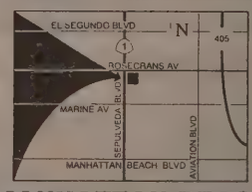

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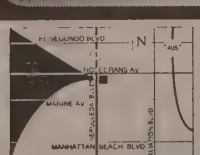

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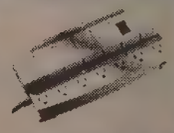

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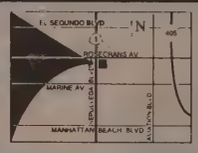

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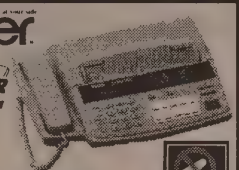

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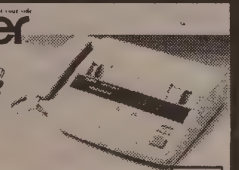

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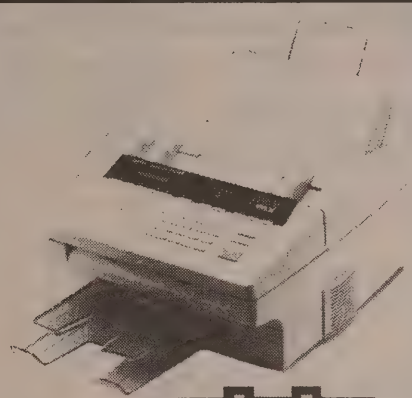

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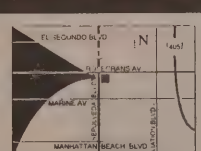

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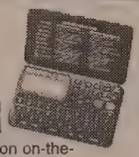
GET ORGANIZED AT FRY'S ELECTRONICS

ORGANIZERS

SHARP PERSONAL ORGANIZER

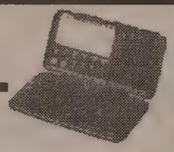


Perfect for the business person on-the-go, this compact data bank incorporates a 14 x 3 line display, built-in calendar, schedule, phone/memo, memo pad, expense, clock, anniversary, and calendar functions as well as QWERTY keyboard to simplify data entry. Once you've used this electronic marvel, you won't leave your home or office without it!

$39.95

Model YO-100
#1800665

CASIO B.O.S.S. WITH 128K MEMORY



This business organizer scheduling system comes packed with powerful functions that are practical and easy to use. The QWERTY Keyboard, telephone directory, calendar, memo function, schedule alarm, world time function, home time function, and schedule keeper will prove to be an invaluable tool in keeping your busy days in order. An excellent investment at...

$119.95

Model SF-7900
#1956818

SHARP 512K PERSONAL ORGANIZER
WITH TOUCH SCREEN TECHNOLOGY

This Sharp Wizard lets you leave your portable computer at home but puts the power of that computer in your pocket! Here's a small sampling of the innovative features. Touch screen technolog ywhich allows you to write or draw on the screen using the Wizard pen, filer which organizes related data into folders that can be transferred to another touch screen Wizard via infrared, and a true word processor with a large screen display and a keyboard that's 75% the size of a standard PC keyboard. The possibilities are endless at only...

$329

Model OZ-9600 II
#1797152

PALMTOP COMPUTERS

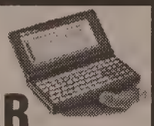
PSION SERIES 3 POCKET SIZED 512K COMPUTER
WITH BUILT-IN SPREADSHEETS

Psion has redefined the state of the art in hand held computers with the new Series 3. It may be small, but this pocket-sized programmable computer comes equippedwith features found in desktop machines plus powerful built-in software, including a full specification word processor and outliner that's compatible with Microsoft word. When using the Series 3 you will quickly learn from the system of graphic displays and option list how easy the Series 3 is to use. And with Psion's unique Multitasking Operating System, as many of the facilities as you want can be used at the same time! Other features include an automatic phone dialer, world information, a time and personal management file, powerful graphics program -ming language (OPL/w) which will enable you to write your own applications and two expansion ports for plug in SSD devices for unlimited memory and software.

$399

Model SERIES 3A
#1843567

HEWLETT PACKARD Authorized Dealer 1MB PALMTOP COMPUTER
WITH 80x25 FULL SCREEN MS-DOS 5.0 & BUILT-IN POCKET QUICKEN

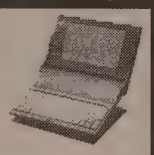


The smallest, lightest HP PC ever comes equipped with complete organizer software to manage your time, tasks and data, plus you can retrieve information instantly with a full range of built-in personal productivity tools. The pull-down menus and dialogue boxes make it simple to master the familiar commands, and the high-resolution display with zoom option is easy to read ! With Lotus 1-2-3 built-in you will have full spreadsheet capability, including graphics and macros. Also includes CC:Mail built-in. Now only...

$549

Model HP-200LX
#1941670

OMORON 1.9 lbs. SUB-NOTEBOOK
RUNS ON 4 AA BATTERIES UP TO 10 HOURS



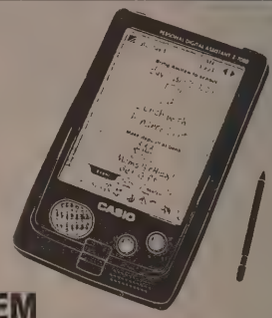
2MB RAM • 2MB ROM • 2 PC MCIA Type II Slots Fax/Modem Built-In • Serial/Parallel • 640 X 400 Resolution Preloaded Software: DR DOS • Bitfax LapLink XL • BitCom DataSel Gold • Contact Manager.
AA batteries not included By OMRON.

$599

Model TOUCAN
#1809653

PERSONAL COMMUNICATORS

CASIO PERSONAL DIGITAL ASSISTANT
DOS COMPATIBLE WITH GEOS OPERATING SYSTEM

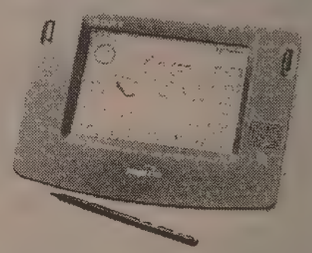


Now an amazing device, no bigger than a small paperback book, can store your hand written notes and sketches, arrange your calendar, keep track of hundreds of phone numbers and addresses, help organize your personal finances, perform complex mathematical calculations, give you easy access to electronic mail and a host of sophisticated on-line information services. With up to 100 hours of operation from 3AA Alkaline batteries, and S-RAM or Flash card compatibility, the versatility and performance of this PDA is unmatched at only...

$399

Model Z-7000
#1815308

SONY Magic Link PERSONAL INTELLIGENT COMMUNICATOR



A revolutionary concept in electronics which integrates the most useful features of personal computers, telephones and pagers in a handheld, portable unit. By incorporating Magic Cap™ communicating applications platform and Telescript™ technology, the Magic Link™Communicator represents a leap forward in the use of technology to enhance your lifestyle. Features include integrated Fax/Data Modem built-in mic/speaker, Pocket Quicken, PenCell Spreadsheet, Spell Finder, Datebook, Notebook, Calculator, File Cabinet, mind game software, and much more. Magic Link™ will also facilitate various modes of communication including Phone, E-mail, Fax, Pager and Infrared, as well as supporting AT&T PersonaLink℠ Services and America Online service.

$899

Model PIC-1000
#1959305

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Prices Good Through November 22, 1994

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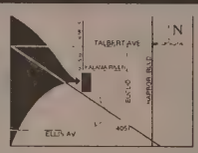

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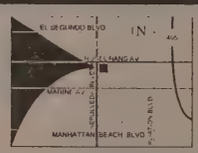

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YOUR BEST PANASONIC HOME OFFICE BUYS ARE ALWAYS AT FRY'S!

ANSWERING MACHINES

Panasonic

ANSWERING MACHINE

Answering System with Auto-Logic Operation, Tone Remote Control, Digital Display, Message Memo Recording and remote turn on. Auto-Logic Operation automatically rewinds, plays messages, stops at the last message and resets itself at the touch of one button.

$39.99

MODEL KX-T1000
#1498194

Panasonic

DUAL MICRO CASSETTE ANSWERING SYSTEM

Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

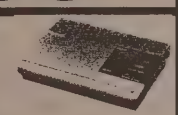
$69.95

MODEL KX-T2100
#1740208

Panasonic

DUAL MICRO CASSETTE ANSWERING SYSTEM

WITH VOICE TIME/DAY STAMP



Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

$89.95

MODEL KX-T2300
#1740219

Panasonic

TWO LINE ANSWERING MACHINE

WITH VOICE TIME/DAY STAMP

Perfect for the home or office, this Panasonic two line answering machine offers voice time/day stamp, voice prompts, 2 variable greeting messages, room monitoring, message alert, call screening, auto interrupt, toll saver, and more. Now just...

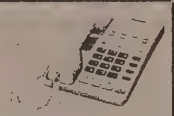
$129.95

MODEL KX-T5300
#1768084

BUSINESS PHONES

Panasonic

SPEAKERPHONE



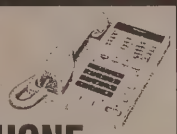
For the office or home, this phone has all the features you need. It has a speaker phone, 28 station automatic dialer, automatic redial and much more.

$49.95

MODEL KX-T2315
#1530100

Panasonic

TWO LINE SPEAKERPHONE



A perfect compliment to your home or office, this two-line speakerphone comes equipped with 3-way conferencing, 20 number programmability, seperate ring switches for each line, and a local mode function. Now only...

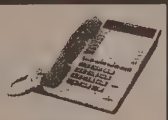
$69.95

MODEL KX-T3120
#1510676

Panasonic

TWO LINE SPEAKERPHONE

WITH LCD DISPLAY



From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

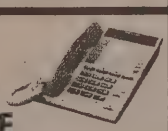
$89.95

MODEL KX-T3175
#1745122

Panasonic

THREE LINE SPEAKERPHONE

WITH LCD DISPLAY



From Panasonic comes this fully featured 3-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 48-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$169.95

MODEL KX-T3185
#1768039

10 CHANNEL CORDLESS PHONES

Panasonic

10 CHANNEL AUTOSCAN CORDLESS PHONE

This cordless phone comes equipped with a retractable flexible rubber antenna, sound charger technology, which helps filter out background noise resulting in enhanced sound quality, and 1-way paging between the base and handset. An excellent value at only...

$79.95

MODEL KX-T3850
#1764839

Panasonic

10 CHANNEL CORDLESS PHONE

WITH QUICK CHARGE & SECURE GUARD SYSTEM

Panasonic has developed the latest in cordless technology by incorporating a Quick Charge system that will enable you to recharge its battery in one hour providing 7-day standby or 3 hours providing 21-day standby! The Secure guard system can help keep your conversations private and help prevent eaves-dropping scanners or baby monitors. Other features include one paging, 10 number memory, last number redial, flash, auto security code settings and much more for only...

$118.95

MODEL KX-T3940
#1820915

Panasonic

10 CHANNEL AUTOSCAN CORDLESS DUAL KEYPAD SPEAKERPHONE

WITH SECURE GUARD VOICE SCRAMBLING

Panasonic's comes equipped with secure guard which scrambles your voice when others try to listen in on your conversations with other cordless phones, radios or even scanners! Other features include quick charge technology enabling to fully charge the battery in only 3 hours for 21 day standby, 2-way paging, intercom, 10 number memory, high gain antenna, and much more. All for only...

$159.95

MODEL KX-T3965
#1886160

Panasonic

10 CHANNEL CORDLESS SPEAKERPHONE

WITH DUAL MICROCASSETTE

This top of the line cordless dual microcassette answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are: 2-way paging, intercom, auto security system, message alert, 2-way and memo recording just to name a few. Now only...

$199.95

MODEL KX-T4400
#1802450

FAX MACHINES

Panasonic

FAX MACHINE

WITH PAPER CUTTER AND SPEAKERPHONE

Panasonic line of fully featured fax machines start with this compact model which includes 64 level grayscale, super thermal paper compatible, paper curl reduction, 164' paper roll capacity, 15 page document feeder, distinctive ring, delayed transmission, paper save mode, telephone directory with alpha-search, 12 station one-touch with 28 station speed dialing, and much more. All for just...

$299

MODEL KX-F550
#1944271

Panasonic

PLAIN PAPER FAX MACHINE

WITH 20 PAGE MEMORY

The ultimate plain paper fax from Panasonic features a jumbo LCD display, 70 page paper cassette, adjustable letter/legal tray, 32 level halftones, polling, activity reporting, 20 page document feeder, broadcasting to 128 locations, fax transfer, enlargement and reduction copier functions, fax/tel switch, 28-station one-touch dialer, 100-station speed dialer, telephone directory with alpha-search, and much more! Now just.....

$899

MODEL KX-F3000
#1850626

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ELECTRONICS Fry's

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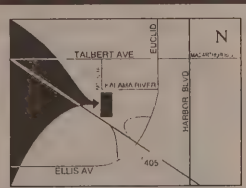

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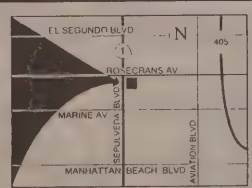

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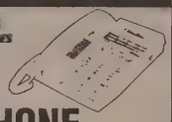
SPEAKERPHONES

BELL Phones BY NORTHWESTERN BELL PHONES



SPEAKERPHONE
WITH 13 NUMBER MEMORY

The convenience of a handsfree speakerphone allows you to do other tasks while carrying on a conversation on the phone. Features include 13 number memory, auto redial, mute, flash, and more. An excellent addition to any home or office at only...

$19.99

MODEL 4350
#1917518

SONY.

SPEAKERPHONE
WITH 32 NUMBER MEMORY

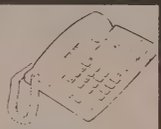
From the leader in cordless phone technology comes a new line of feature phones. This unit has a crystal clear speakerphone, 32 number memory and more!

$49.95

MODEL IT-D100
#1516878

Panasonic

LCD READOUT SPEAKERPHONE



This outstanding value from Panasonic offers a 12-digit LCD readout for phone number, clock, call timer(minutes and seconds), and operating modes. Perfect for the home or office at only...

$69.95

MODEL KX-T2365
#163665

SONY.

TWO LINE FEATURE PHONE
WITH SPEAKERPHONE

Phones with 2-line operation are relatively common, but this phone offers a distinctive ring for each line! The LCD indicator will tell you the number dialed and the time. Now only..

$79.95

MODEL IT-D250
#1516904

MULTI-LINE PHONES

BELL Phones BY NORTHWESTERN BELL PHONES

TWO LINE PHONE

Perfect for the home office with multi-line needs, this 2-line phone from Northwestern Bell features line-in-use LEDs, 3-way conferencing, 15 number memory, hold, flash, pause, and ringer controls. An excellent value at...

$39.99

MODEL Easytouch 2202
#1890905

Panasonic

TWO LINE PHONE

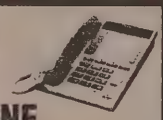
A two line phone doesn't have to cost a fortune. Panasonic has the low cost answer for you. This unit has a convenient auto dialer, conference calling and much more!

$69.95

MODEL KX-T3110
#1505313

Panasonic

TWO LINE SPEAKERPHONE
WITH LCD DISPLAY



From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$89.95

MODEL KX-T3175
#1745122

AT&T

THREE LINE SPEAKERPHONE

AT&T's multi-functional centrex compatible 3-line speakerphone comes equipped with page, intercom, 3-way conference, LCD display, 40 number memory, auto line selection, hold, do not disturb function, auto-redial, mute, programmable pause, call transfer, flash, seperate ringer controls, and more, all for only.....

$179.95

MODEL 843
#1853892

ALL DIGITAL ANSWERING MACHINES

AT&T

ALL DIGITAL ANSWERING MACHINE

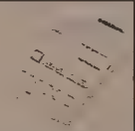
This AT&T answering system utilizes tapeless digital technology to ensure consistent recording quality over the life of the system. The convenience of new message playback, outgoing message bypass, remote system turn on or off and remote message recording makes this an excellent value at only...

$69.95

MODEL 1710
#1853906

BELL Phones BY NORTHWESTERN BELL PHONES

ALL DIGITAL ANSWERING MACHINE
With Time Day Stamp & 13 Minute Capacity



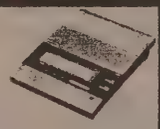
This fully featured all digital answering machine from Northwestern Bell comes equipped with Time/Day Stamp, Programmable Security, Selective Skip or Erase, Call Screen, Extension Pickup, Auto Disconnect, Multiple Memo Record, Toll Saver, VOX, 13-Minute Capacity, Remote Access, and much more! An incredible value at just...

$69.99

MODEL 700
#1964820

Panasonic

ALL DIGITAL ANSWERING MACHINE
WITH VOICE TIME/DAY STAMP



This Panasonic all digital answering machine comes equipped with 30 minutes of total recording capacity and voice promps for time, AM/PM, voice remote menu, number of messages, pre-recorded greeting messages, and time/day stamp on each message. Other features include LCD readout, quick playback, message alert, room monitoring, 2-way and memo recording, and much more! Now just...

$159.95

MODEL KX-T8100
#1914607

AT&T

ALL DIGITAL ANSWERING SYSTEM SPEAKERPHONE
WITH 2-LINE • 4 VOICE MAILBOXES • 26 MINUTE TOTAL CAPACITY

AT&T's Tapeless digital technology ensures instant access and consistent recording quality. The individual voice mailbox system incorporated into this unit allows callers to leave separate messages for up to 4 people. Each of these voice mailboxes allows for a personal outgoing announcement. By utilizing the selective save and delete functions you can save the entire message or only the parts you need, and easy to follow prompts will direct you through a menu of remote commands when calling from a touch tone or rotary telephone. Other features include voice/time stamp, handset playback and record, display screen indicating time, day, and number dialed, audible message alert priority calling, memo, and 2-way call recording. An invaluable addition to any home office at

$199.99

MODEL 1872
#1954997

COPIERS

SHARP

PORTABLE COPIER

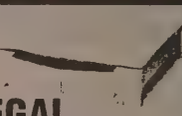
This Sharp copier weighs in at just 14.8 lbs. and is amazingly compact and lightweight, making it easy to be carried or stored in a small place. Features include auto exposure control, auto start function, auto power shut-off mode, which completely cuts the power approximately 90 seconds after you finished copying. An excellent value at only.....

$279

MODEL Z-20
#1885620

SHARP

LETTER/LEGAL PERSONAL COPIER



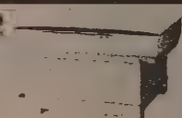
Compact and lightweight, this Sharp copier weighs only 17.5 lbs. and fits virtually anywhere! Yet, it even lets users make multiple copies up to legal size (81/2" x 14") originals onto a wide range of papers from 81/2" to 4" x 6", allowing an expanded range of applications. Other features include auto exposure, 50 sheet paper tray capacity, auto start function and much more! An excellent value at just...

$429

MODEL Z-27
#1892837

SHARP

LETTER /LEGAL COPIER
WITH STATIONARY PLATEN



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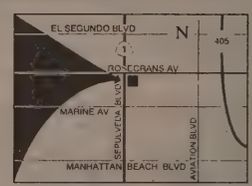

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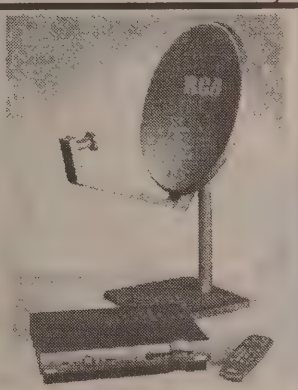

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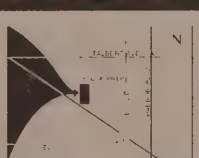

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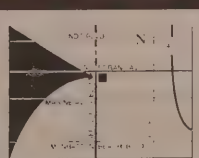

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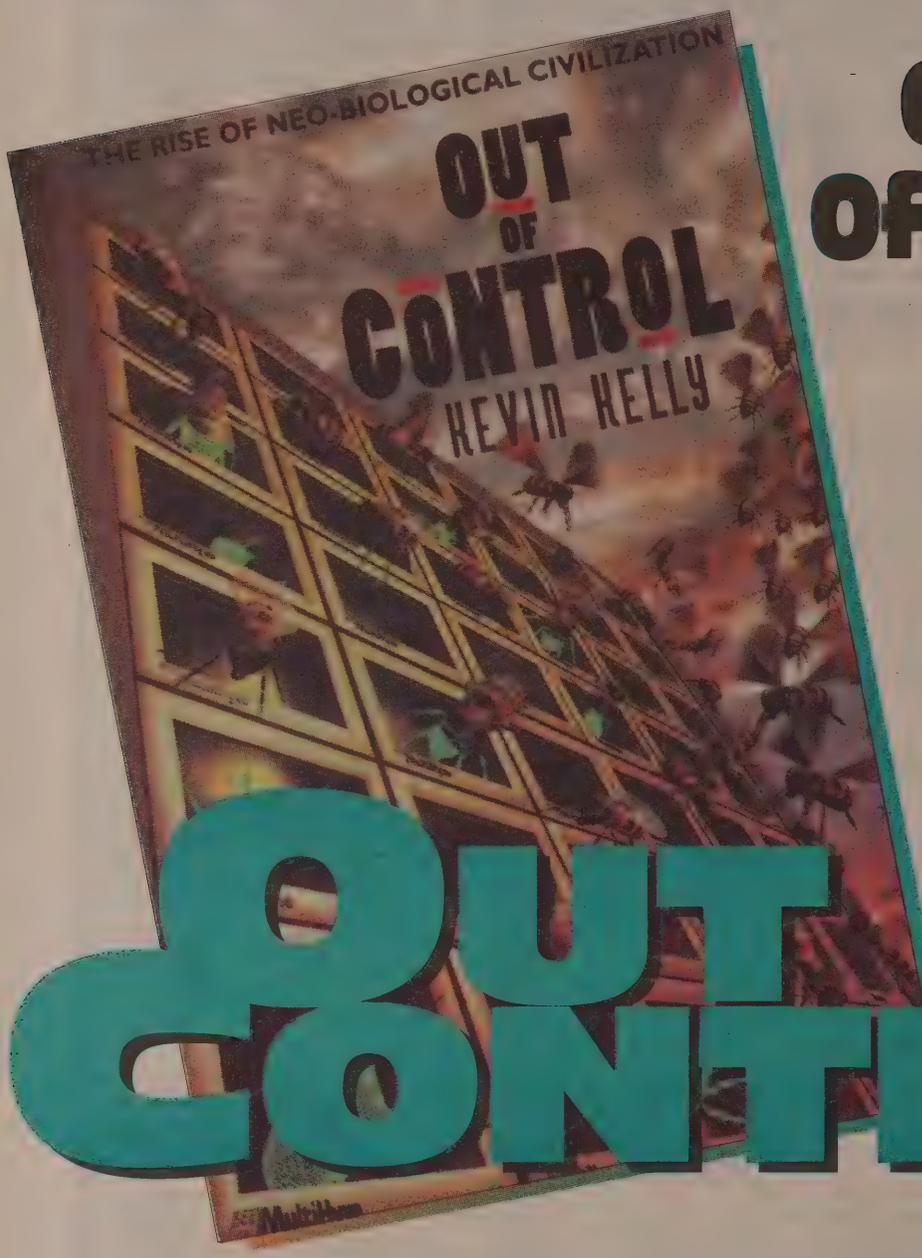


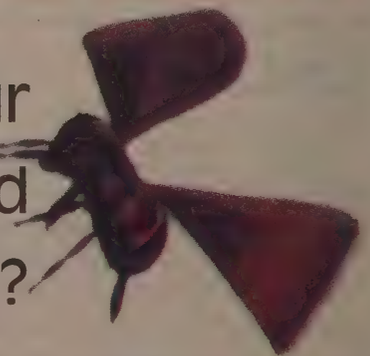
The Coming Convergence Of Biology And Technology

An Interview With Kevin Kelly

By Birrell Walsh

OUT OF CONTROL:

Will the software that runs your office one day be evolved rather than written?



Will it be friendly or unfriendly?

Will robots, imitating schools of fish, explore space in swarms?

In a hypernetworked world, will people pay for the privilege of being *disconnected* from the Net? Will privacy become something only the rich can afford?

Will new currencies grow up like grasses? Will you choose your currency provider the way you now choose your long-distance company: for the convenience, trustworthiness, and—oh most important—anonymity they offer?

As in the deepest ocean, there are strange things growing in your near future.

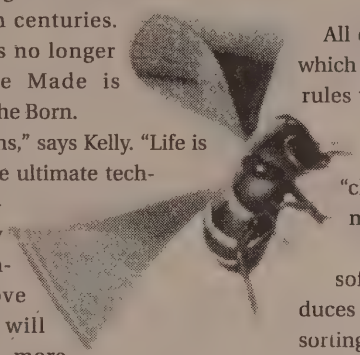
Biology and software, robots and currency transactions are flows of information. What began as a common language to discuss transformations has overflowed and allowed these disparate reservoirs to merge into one wild, very high sea.

Kevin Kelly fishes these waters. Editor of *Wired* magazine, former editor of *Whole Earth Review,* on the board of the WELL since its inception, Kevin Kelly

"The job we have for generating this kind of computer-of-ten-years-hence is to plan so that it doesn't become too unpredictable, too wild. Our ideal is not to make nature, the wild, but to make a garden."

has watched the InfoSea for many years now. In his recent book *Out of Control: The Emergence of Neo-Biological Civilization* (Addison Wesley, ISBN 0-201-57793-3), he takes us out in a glass-bottomed boat to find out what is maturing in the shallows—and the deeps.

What he sees growing is a convergence. The differentiation between mechanical and biological ways of being—what Kelly calls the "Born" and the "Made"—grew in the eighteenth, nineteenth, and twentieth centuries. But that separation is no longer increasing. Now the Made is increasingly imitating the Born.

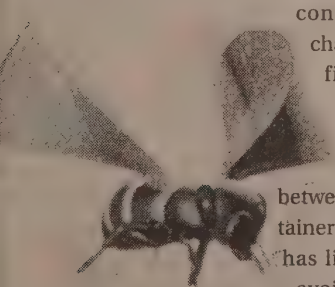


"BioLogic always wins," says Kelly. "Life is a technology. Life is the ultimate technology. Machine technology is a temporary surrogate for life technology. As we improve our machines they will become more organic, more biological, more like life, because life is the best technology for living."

Further: "I take the view that life is a nonspiritual, almost mathematical property that can emerge from networklike arrangements of matter."

Kelly pursues two themes throughout his book: Life is a characteristic that arises in all sufficiently complex systems; freely evolving life is the best model for any new life. He illustrates these two themes by what is happening now in the working and living Sea of Information.

For example: At night in the MIT labs, a robot creeps about. It has no central nervous system, no logic system that makes all its decisions. Instead it has a family of reflexes that interact without central control. Is the result chaos? No, the robot finds empty soda cans and collects them. It can distinguish between an empty container and one that still has liquid in it. It can avoid obstacles in its travels. It can find its way home to dump its load of cans.



It is operated by the interaction of its parts. It has no center, no "self." It is a small example of what Kelly calls a "hive mind," a distributed consciousness.

To Kelly, this same distributed mentality is characteristic of the kind of life arising now in the information soup: A 1991 conference in which five thousand people in an auditorium flew a flight-simulator program by voting with waved wands. World economic markets. Fashions.

All of them imitate the "flocking behavior" by which birds and fish move in united groups. Simple rules with many voters can produce robust and adaptable swarms. This, says Kelly, is the age of "swarmware." It will replace "clockware," the centralized single-decision-maker systems of the mechanical age.

The same distributed approach is evolving software. Kelly's tour of lifelike systems introduces us to software organisms that develop new sorting procedures for databases, and new kinds of graphic art for painters. They both work by an internal evolution that is consciously modeled on biological development. They have both produced beautiful forms unknown to us before.

"Out of control" is an expression that Kelly found among scientists making autonomous robots. It became the title of his book when he found it as a characteristic of "vivisystems," in protoplasm as well as silicon.

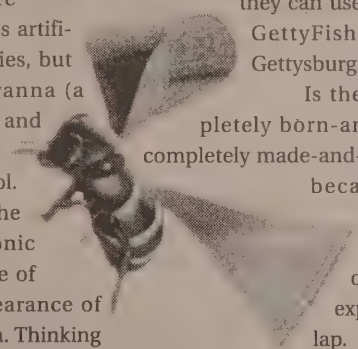
Following his twin themes of life as an inevitability in complex systems, and the free evolution of those forms, Kelly cruises information waters pointing out the results of complexity and autonomy. He takes us to the Midwest where ecologists were attempting to reevolve natural ecologies artificially. They were trying to evolve prairies, but the system wanted to become a savanna (a prairie with trees) so they stood aside and watched it follow its own inclination. The savanna had gone out of control.

Turning to information-in-silicon, he predicts and discusses purely electronic anonymous currencies, the importance of encryption to freedom, and the appearance of "god games" like Populous and SimEarth. Thinking about god games, Kelly points out again the role of liberty for the creature: a god who does not grant freedom to the created will be bored. The creator, as well as the created, needs the creation to be out of control.

If freedom, or "out-of-controlness," makes possible the new, it is the emergence of life in any complex system of sufficient size which sets the stage. Life is an anti-entropic, self-maintaining "vivisystem" that persists and reproduces while patterns around it disintegrate. Does it need to be organic life? By no means, Kelly reminds us: "Of the thousands of computer viruses cataloged by virus hunters so far, not one species of them has gone extinct." Life can be organic, inorganic, or symbiotic.

Symbiosis of mechanism and biology have made possible the pocket planet called the Biosphere. A closed ecology in the Arizona desert with sample life from around the earth, it is possible because electronics and people shore up the works. It is really a living system, with trees and birds and frogs and tiny seas. In certain ways it seems to be artificial, with made-not-born prosthetics like algae scrubbers for its otherwise natural coral reef.

At the other end of the spectrum we find El-Fish. This software program, marketed by Orinda, CA-based Maxis, was created in part by the same Russian who brought us Tetris. It gives the user an electronic aquarium, with lifelike fish and plants moving in the water. It is really electronic and artificial. But its patterns are borrowed from life. The fish and the plants are evolved, not made, from genetic algorithms included with the program. One can design one's own life-forms, or roll the Darwinian dice. Some users have discovered that they can use text files as genotypes: the GettyFish was created using the Gettysburg Address for chromosomes.



Is the Arizona Biosphere completely born-and-not-made? Are El-Fish completely made-and-not-born? These questions, because they cannot be answered, show that the space of life and the space of machine have both expanded, and begun to overlap.

"I think that the network we are creating does share many lifelike attributes, right at this moment," says Kelly. "But many of them are sort of invisible—that's the reason I wrote about them. It's a little hard to see, unless you kind of stand back from it."

Ten years from now, what will a person see to let them know that they're connected to a worldwide organism?

Even in ten years, I think the sense of its being living will be very subtle. The kind of thing that you should see is that your computer will be a little different each time you turn it on. There will be slight differences.

What humans are about is trying to control or manage those differences so that there is not *too* much, yet there's enough that there's something exciting.

We struggle with upgrading software, and all the kinds of changes which that makes in our computers, each time we load a new system into it. What we might be seeing is something more organic, in the sense that there are small changes over time, rather than these sort of abrupt changes.

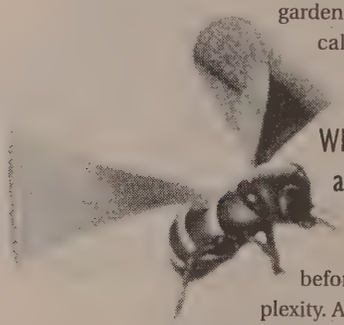
Will the changes be a surprise for the user?

Yes, in the sense that the user has not created them, they will be surprising. Hopefully small surprises. They'll be the kind of surprises that say, "Oh, this runs a little faster," "Oh, here's a little goodie I hadn't seen before" deposited in your computer by something or other.

One of the lifelike aspects that we might see is that there's less of a sense that our computer is an island; rather, it becomes part of a continent. So things happen from the outside, while we're asleep. Perhaps we're selling our CPU cycles and our computer is being used for something. Or there are things that we've said that we're interested in, and they get deposited in our file, our account, our mailbox. Or we're interested in something, and we activate an agent to go out and find something and negotiate for that and bring it back at the right time. Maybe we sent something out long ago and it finally turns up.

So there will be a sense of things working behind the screen, but us not being aware of the kind of productivity, or of the "small minds" behind the screen.

The job we have for generating this kind of computer-of-ten-years-hence is to plan so that it doesn't become too unpredictable, too wild. Our ideal is not to make nature, the wild, but to make a garden. There's unpredictability in a garden, there's the amount we like. But it's not typically wild like the great Yosemite, where anything might happen—wildfires and whatnot.



What has changed to make it possible to have any kind of wildness at all?

Primarily one thing. It was not possible to create artificial wild things before, because we simply did not have the complexity. A required minimum amount of complexity, of environment as well as of the organism, is required before something can take on the attributes of life, including life itself.

The evolution of life required a molecule of certain complexity, to arrange into these basic building blocks of a certain complexity before it could make itself a replicating molecule or something that would have metabolism. And even though mathematically we've shown that these things can be relatively simple, the complexity of even those very simple molecules is still far beyond the kind of machines that we've been making.

This whole new horizon—bringing the kind of wonderment and, really, the power of nature to machines—is all built on the fact that finally we can make machines that are almost as complex as what is found in nature.

There's another side to that story: in our process of making machines more and more complex, we got to the point where we could make them more complex, but we didn't know how to manage them and control them, to use them or to utilize them.

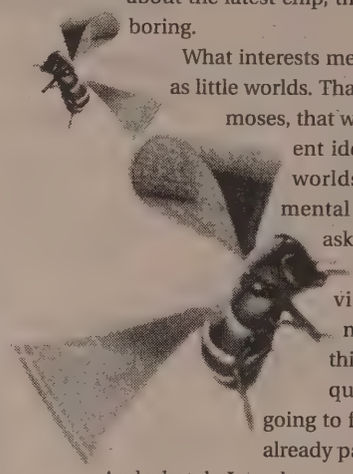
It turns out that really the only way to manage the complexity of these artificial systems is to use what we know as biological principles.

My book is sort of an exploration of what those principles are: What are the basic principles of biology that are not just specific to the instance we have—the "implementation" of it in carbon molecules. What are the general principles of biology that we can use to transfer into machines?

Are you saying, then, that because the level of complexity necessary for life has been reached, and because the only principles that will manage that complexity are biological, that "real, true life" is appearing in machines?

It's a good question, and to me the most exciting one that's being asked these days.

Let me back up and say that, in general, I'm not a technoperson, I don't care about the latest chip, the latest version of software. This is all very boring.



What interests me about computers is that we can use them as little worlds. That we can create small universes, small cosmoses, that we can change very easily and try out different ideas. And the kind of ideas that these little worlds call forth are some of the most fundamental questions that we as humans have been asking.

When you can do something like virtual reality, where you put on a head-mounted display and immerse yourself into this colored polygon world, you begin to ask questions, like, "What *is* Reality?" If you're going to fake reality, or if I somehow or other so far already partially faked it, what is it that's doing that? And what do I need to completely assimilate reality? What is reality at all?

The same kind of question is being asked of life. We make these small models of living systems and begin to say, "Well, this is very lifelike, or somewhat lifelike." What *are* the qualities of life? What is life? And the answers to that range all over the map.

Some people will be very quick to embrace the idea that these are living things because they share some of the qualities. Other people would say, "No, this is obviously not life," so that every time you come up with a list of qualities and the scientists are able to satisfy them, they say, "Whoa! Obviously that list was wrong. We have to add some more, change the list." So it becomes a moving target.

Artificial intelligence is a little like that as well, where the very act of trying to satisfy some initial definitions causes a rethinking, a reexamination of the very problem.

I'm of the bent that life is a process. "Life is a verb," I call it. Life is a dynamic, and it is independent of whatever materials it can be put into. Another way of saying that is that there are probably many kinds of life. We have one example, the stuff outside the window here.

Part of the problem with talking about life is that most of our experience is based on an example of one. It's very, very hard to generalize about one thing. What artificial life in computers and other mechanical systems is showing is that life is probably a very big, broad class of things. There are probably lifelike systems in other arenas such as computers or robots. I call these things "vivisystems" to try to get away from the idea of life...

A "vivisystem" is any kind of a system that shares some of the qualities of living systems. So that it self-replicates, it has metabolism, it has emergent governance that's in itself, it's self-stabilizing.

I don't claim that's an exclusive list, or that you have to necessarily have all these qualities. I mean the Michelangelo computer virus and the AIDS virus are both members. It's a general class of systems of which the SimEarth simulation and the Gaia outside our window, the earth as a whole system, are both members. These are very large self-sustaining, self-correcting systems.

Is it fair to say that corporations, and many of the programs that run on computers, already share many of the characteristics of life the way you define it?

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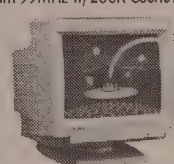

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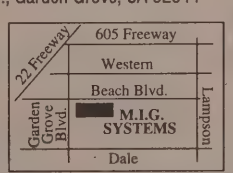

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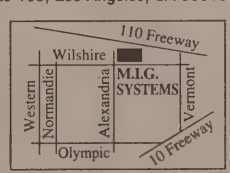

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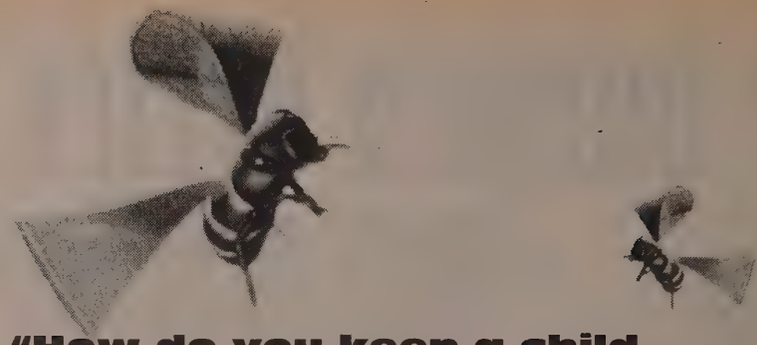


Yes, they do. They share a lot, and so the question is, "If they share a lot, are they it?" If it walks like a duck, talks like a duck, is it a duck?

Maybe yes, maybe no. It depends how you want to use it. Yes, "a corporation as an organism" is very old—hundreds of years old, maybe more. It's a very old idea that machines can be an organism too. The difference now is that rather than being just a poetic metaphor, we know enough about the principles of both machines and organisms to find out that there is enough of an overlap in their dynamics to be useful—and to use some of those organic principles in machines to make them work better, to make them act faster, think more intelligently, adapt quicker. So there is finally a payoff to that metaphor.

You talked a lot about a lot of positive things: better control, better dealing with limitations. Are we also beginning to face the "golem problem"—that the creature you've created gets out of control, and becomes a monster to you?

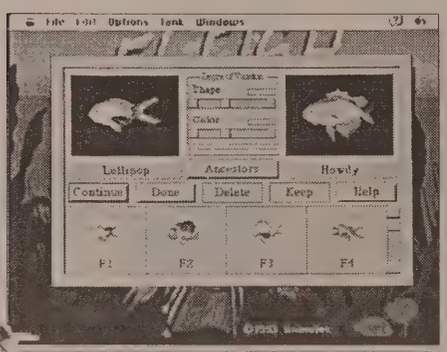
I don't think of it as the "golem problem" as much as maybe the "Goldilocks problem."

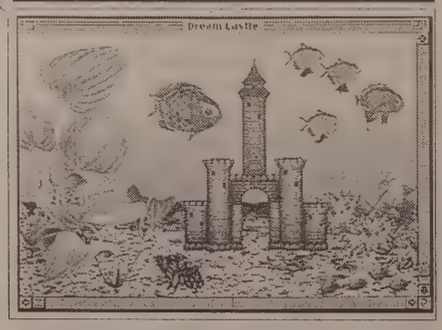
Anybody with kids knows that kids can be monsters. The problem you have with a kid is that you have a being that wants to have its own mind, its own agenda; and as parents that's what you want for it too.

So how do you keep it from becoming a monster? The answer is not that you don't allow it to be born. The answer is not that you totally control it. The answer is that you train it up, you manage it, you instill certain operating principles, you guide it—and then you let go.

I think that it's the same thing with technology. It's true that many parents let go of kids that are monsters. What should we do about that?

It's not that you stop letting them go. It's that you have to train the mind in the right direction—not so that it's no longer unpredictable, or doesn't surprise you. In fact, quite the contrary, you would *love* it to surprise you; you would love a child to come up with something new or original.





The same thing with our technology. It has great power. Its greatest power can only be harnessed by us, in a selfish way, by letting go of it, and letting it have its own agenda and its own room to move. But that doesn't mean that we have to tolerate everything that it produces.

And in fact what we have to learn how to do, and what we are learning how to do, is to domesticate it, to train it, to manage it. It's a type of co-control, where you are sort of riding it, surfing it, harnessing it—all those words. It can still surprise us, but in the general directions that we want it to.

Which is not to say that we will never be unhappy with it, that it won't make mistakes, that it won't cause problems. But again, that is sort of what any parent knows.

Can you give an example of an "emergent life-form" that we have achieved that kind of co-control with?

Jurassic Park dinosaurs—those dinosaurs were re-created until they actually had, in the computer, a kind of virtual being. They had artificial bones, they had artificial muscles, they had artificial gravity, they had artificial skin. And the dinosaurs' movements actually emerged out of that combination—of trying to move this foot, this dinosaur that had all this virtual being and mass—and that's what gave it its realism.

"How do you keep a child from becoming a monster? The answer is not that you don't allow it to be born. The answer is not that you totally control it. The answer is that you train it up, you manage it, you instill certain operating principles, you guide it—

and then you let go.

The next step with these dinosaurs was to put in behaviors, little behavior models, so that rather than the animator having, say, to move each foot in the walk, the animator would tell the dinosaur, "Walk from A to B"; and the dinosaur's artificial mind, so to speak, would figure out how to move its legs. There's an example.

The human operators, the human animators, were not deciding where to move the leg. The dinosaur had a certain amount of freedom in that. And that freedom actually made the walking more realistic, besides easier. There is a certain direction you want to get, from here to there, and how you get to there doesn't really matter.

You said the virtual dinosaur from Jurassic Park was also usable in The Flintstones?

The Flintstones, and now there are a lot of experimental characters, not commercially presented right now. They are looking at other kinds of synthetic actors, where you give them stage directions. You say, "Walk from here to here, and throw down your glass angrily." All the multiple possibilities of actions in between that are decided by this character, which is kind of located on a computer. That's one direction in which this kind of thing can be directed.

The other very parallel path to that is that cartoon characters, I discovered, are kind of like robots without bodies. So the same kind of thing is happening with robots. You tell a robot, "Paint this chair." You don't necessarily have to tell it in what steps to paint the chair. It's painting it all white, and there's no problem; but it's still a very complicated task.

One could get to the point where we say, "Paint this chair," and we have the line "Decorate the chair," and the robot arm is painting it and adding color and stuff. Within certain limits we are going to accept the product or not; and we'll train them with heuristics, saying, "Use complementary colors, orange and blue." We'll teach them the laws of art, essentially, within certain parameters.

And this is not something that is horrible. This is not harm. The fact that we're turning over a certain control is something we do all the time with other biological organisms. The thought of doing it for machines is, I think, unnecessarily scary. It's a past pattern that we can overcome.

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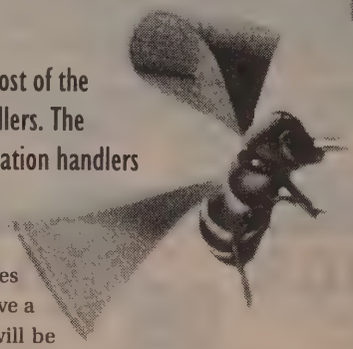


We have a pretty deep fear of machines. Most of the people who read this are information handlers. The machines you are talking about are information handlers that will probably outperform them. Why shouldn't they be terrified?

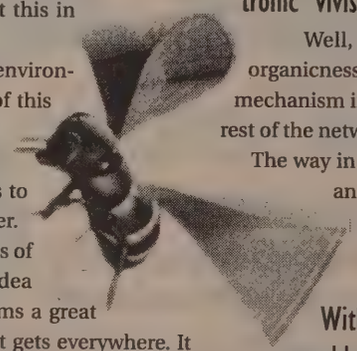
Well, I guess the terror of machines comes in several varieties. There are those who have a legitimate concern that their livelihood will be replaced. Most of the people, I think, who are afraid of being replaced by machines should *embrace* machines to replace those jobs. I mean, who wants to have a tedious job assembling little parts into plastic dolls, or painting the same fender a thousand times a day? It's a very toxic job. So a lot of the jobs that will be lost *should* be lost to machines.

The other fear of machines is, I think, a more recent one: machines as symbolizing the destruction of the environment. What I like to stress in my book is that those are two separate things, that the rise of machines does not necessarily mean the environment has to be destroyed, completely.

And a third fear of machines is this matter of control. Because there are often mistakes made by machines, and they are sometimes large-scale mistakes, there is a fear that since we do not control the machines, or if we cannot control them, therefore we shouldn't trust them. Of the three fears, my book addresses mostly the third one, which is the control aspect.

The analogy that I make is that if we were living on a steel planet right now, a great big steel sphere, and there was no biological life on it, and some young group of twenty-year-olds comes in and says, "Hey, we have this great thing we want to bring in. We have this dump truck full of seeds. You know: life-matter and propagation and twigs and stuff. We're going to put this in here and it's going to be marvelous."

And they say, "Oh wait wait wait wait. We need an EPA environmental protection report that follows the consequences of this and tells us what's going to happen."



So after months of study they make this long report, and it says, "Well, this stuff comes in, and it starts to grow everywhere. It grows in every single crack. It takes over. It splits up the steel. Things spread everywhere. It replicates of itself. There're viruses that will affect you. We have no idea what happens. Species will come up on their own. It forms a great matrix for all kinds of natural phenomena like wildfires. It gets everywhere. It just takes off and it completely fills your whole earth and it has its own agenda. You'll get sick and die from it. There's rats and vermin."

It goes on and on and on, and there's no way in the world that anybody would accept this as desirable. Stuff is happening out there and we have no idea how it works.

Well, biology is a technology. That's the other message of my book. Biology is a very sophisticated type of technology. It's a technology that we didn't invent, but it's a technology. Those little plants out there are a type of machine. And we accept this, we accept the tradeoff. We accept the fact that we grow tomatoes and have no idea how they work, because the benefit we get certainly outweighs it. And we don't have much choice.

People seem to say: "I want biology, but I don't want machines." I think what happens with the kind of technology we're making, as it becomes more biological, is that the power it offers becomes more biological-life-like, and we still have the same kind of decision to make, which is: "It will work on its own, it will do this wonderful stuff, there's a tradeoff, there's a price," which is we don't completely understand it, we're not completely in control of all of it.

But overall it will be a positive. We will deal with the downside. We will deal with the outbreaks of stuff. And we will pay the price.

Did the same debate take place among the angels when humans were being made?

Probably. And you know the little parable that I tell in the book, of the Genesis story.

God the Creator, who is this sort of "software being," you call it, the thing that makes the universe, decides that he wants to make one of his creations to be a being that can also create, like him. So you have these things down here with two legs that go around creating paintings, a TV show, they're creating wars, and they're creating cathedrals and whatnot.

And they get to a point, very much in the cycle of things, when they decide that *their* ultimate creation could be to create a thing that could create, like them. It's like this whole cycle.

I think that if we look at the Genesis story, of God saying, so to speak, "If I give you the ability to create, then that means that you have the ability to be a monster or not. That is the only way I can give you that full creativity. If I limited it to you, which I don't want to do, it's boring. If you're going to make what I tell you, that's not creation. But to have true creativity, you have to be able to go anyway you want, to be a monster, to do evil. You will be punished if you do, but you have that option."

I think the same thing happens when we are making our own creations-that-can-create, which is that to have that full power to surprise us, to make up original and new things, to be really generally creative, we have to allow the possibility of a monster.

Where could a person look in their environment to see mechanical and electronic "vivisystems" in the present, rather than ten years from now?

Well, the Internet is close to having some of the qualities of this organicness. The packet-switching network could be viewed as a self-repair mechanism in some sense, because if one part of the network goes down, the rest of the network sort of repairs itself by routing around.

The way in which the Internet grows is very much of an organic model. It's an incremental adding-on. It's how a cell expands. 747s don't grow. Most of the things we make don't grow in an organic way, but the Internet does have an organic growth model.

With the awareness you have right now, in what kind of business would you be investing?

In the news these days is the sort of almost-demise of thinking machines, of parallel computers—and I think that's what I would invest in right now. I would invest in parallel processing machines; because even though right now they don't seem to be doing very well, that is definitely the direction things are going to move. Parallel equals organic, basically.

What industry would you predict is the buggy-whip of this cycle? What industry is really going to die?

That's a good question. For the long term, I would not invest in modems. I think that someone like AT&T should do all this stuff internally. I mean there shouldn't be banks of modems in people's lives. As I understand modems, they perform a really weird function, and they seem to be an unnecessary step in the greater transparent step that you like, where you have digital data and you send it along a wire, and it is switched to where you want it. I think modems are a very short-term technology, a step to somewhere else.

The problem is that usually it is very rare for a technology to completely replace something. Books are going to be around, magazines are going to be around, faxes are going be around, although one hopes that analog faxes go away.

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"Biology is a very sophisticated type of technology. It's a technology that we didn't invent, but it's a technology. Those little plants out there are a type of machine."

I don't think I would invest in a major TV network. Well, it's very obvious that with fiber-optics and satellites coming down the line, the dominance of the three major TV networks and their broadcast-based model is going to go away. In fact I don't think I'd even invest in the big online services—CompuServe, AOL—because I think they also are going to go away relatively soon.

You talk about the "I-point," the "Irreversibility Point" in living systems. Have we reached that with mechanical life?

Yes. The complexity of machines has reached the point where it has the richness necessary for life. An example of that is that there are two or three computer viruses written a day, which is an astounding number. It's mostly sort of underground work. And as far as anybody knows, no computer virus has gone extinct. So one could say, as long as there are computers there will be computer viruses.

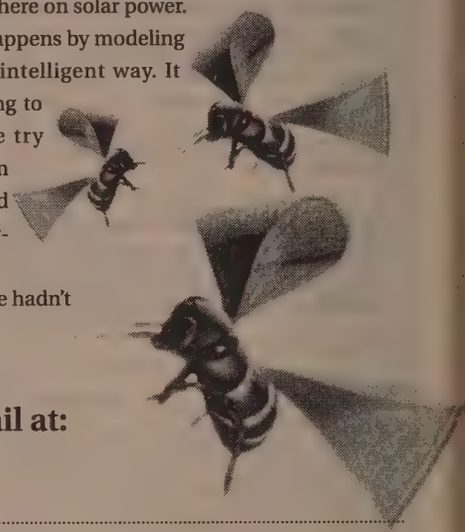
I think that we've reached that point, that as long as there are humans around, machines will be around. It will just not go back.

There's another level of the I-Point where you have self-replicating machines. You have robots that make robots, and humans are out of the loop. You have little tiny "gnatbots" that are breeding and making gnatbots—then that's a different level of the I-Point which we have not reached yet. But we could look forward to reaching it.

It might be a hundred more years before we have completely autonomous, self-replicating, self-metabolizing mechanical life—I mean, ones that we didn't have to give batteries, they're just out there on solar power.

And we will still try to direct what happens by modeling the very vast connections in some intelligent way. It seems to me that the best way is going to be an evolutionary way, where we try something, many things. A lot of them fail. We select the ones that work, and make the variants of those, and go forward.

And it may lead in directions that we hadn't conceived. ■



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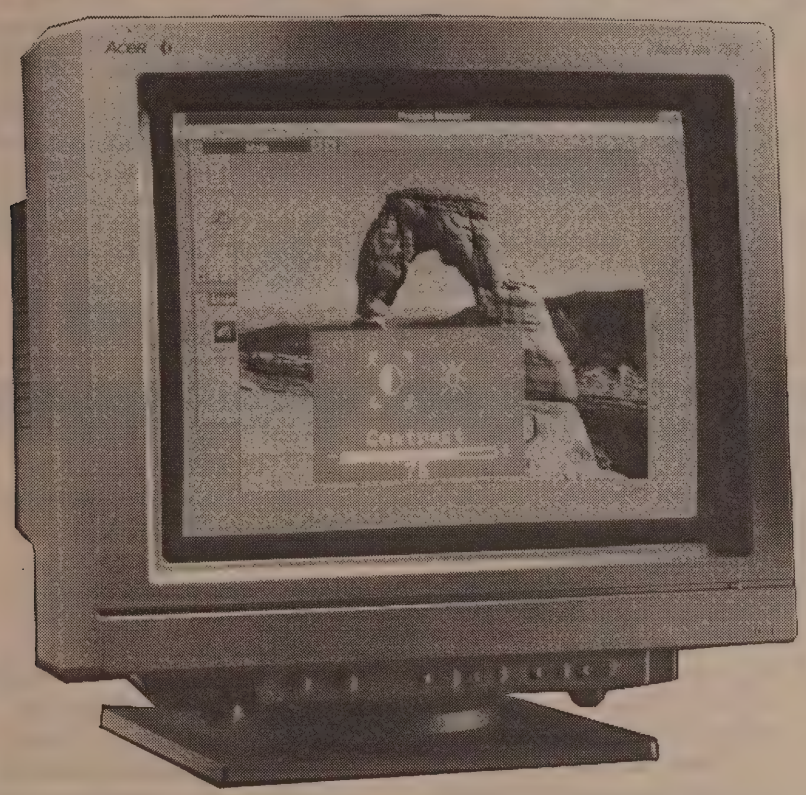

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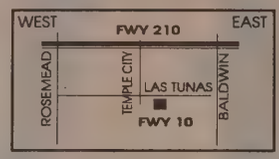

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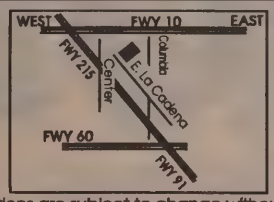

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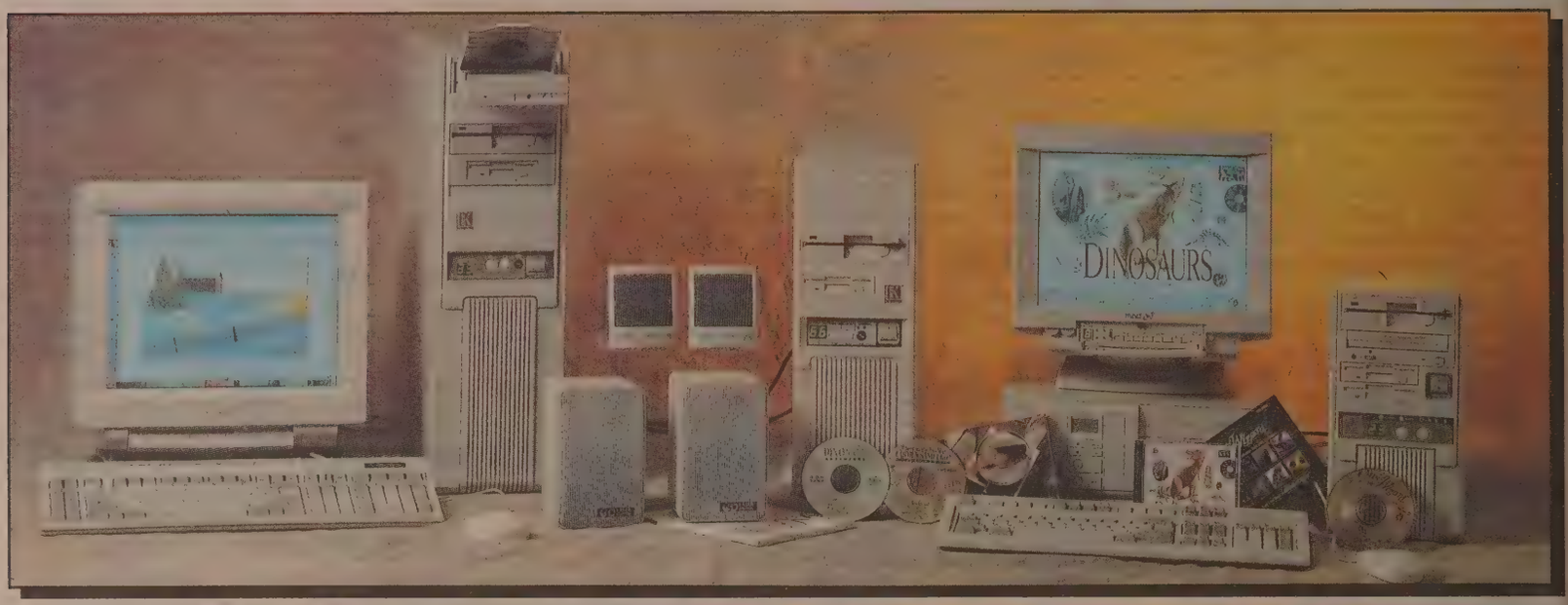

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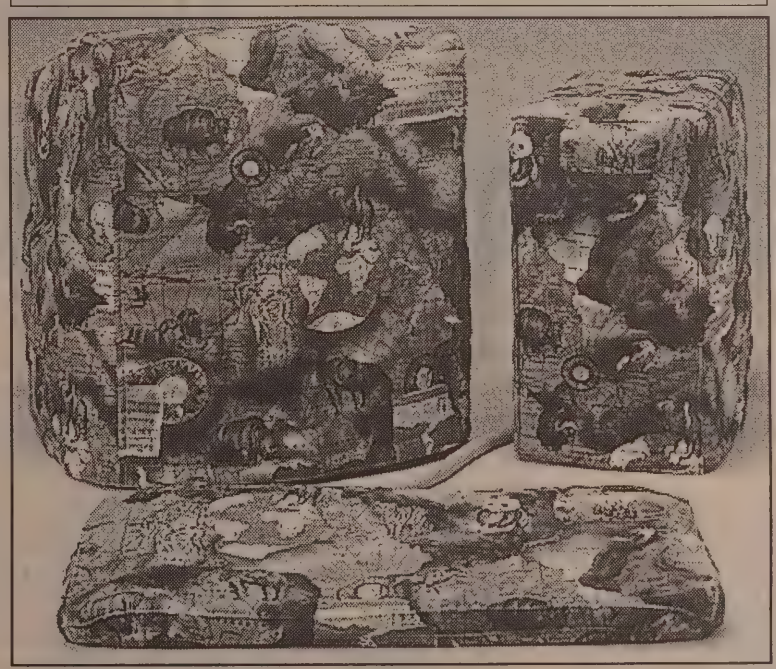

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3-D Animation Project

A Learning Experience

This month I'd like to share with you my experiences working on my first (read: paying) 3-D animation job. Jim Carey, the multimedia producer I interviewed for this column a few months back (and not Jim Carrey the actor!), recruited me to do some LightWave 3D modeling and animation. The project was to create three short 3-D animations involving a satellite-based phone system.

TAKE ADVANTAGE OF RESOURCES

First off, let me say that I am far from being a LightWave expert. In fact, initially, to say I was good at it would have been stretching the truth.

However, I have always found 3-D animation intriguing, and have diligently completed every tutorial I've come across. The publication *LightWavePro* has been particularly helpful in this regard.

I also created my own database using Helm, which includes brief descriptions of 3-D modeling articles and tutorials, and any tips I pick up; I can then do a quick keyword search and find the information I need, and/or a reference that will point me to a particular article. You should be able to build your own using any database program. (If you're interested in using Helm for this, see the June 1994 issue of *Amazing Computing*.)

Another resource I use is the LightWave Internet Mailing List. Here, LightWave-related email messages are sent to a central Internet address. All of the email is then redistributed to all members of the mailing list. You can learn a lot by just reading the mail; of course you can always ask your own specific questions.

The LightWave Mailing List is frequented by the likes of Alan Hastings and Stuart Ferguson, the LightWave programmers, as well as John Gross, a 3-D animator with Amblin Imaging (*seaQuest DSV*) and editor of *LightWavePro*, just to name a few. Be advised that this is a high-volume operation, and it is not unusual to receive a hundred email messages in a single day!

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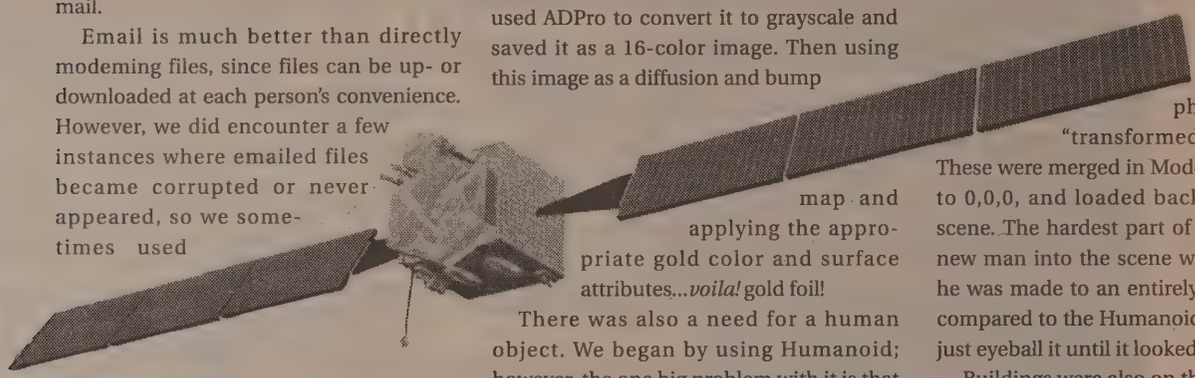
THE INTERNET AS ARTIST'S TOOL

The Internet played a vital role in this project. Although Jim and I only live thirty minutes apart, it would be a hassle to personally exchange computer files, especially considering we needed to exchange files on nearly a daily basis. Although we use different online services—Jim uses Portal and I use BIX—both services support Internet mail.

Email is much better than directly modeming files, since files can be up- or downloaded at each person's convenience. However, we did encounter a few instances where emailed files became corrupted or never appeared, so we sometimes used direct modem connections. Luckily the calls were local.



Generally, Internet email is for alphanumeric text only and, therefore, binary files cannot be transferred. However, thanks to some clever utility programs that can convert binary to ASCII and back again, we were able to exchange any type of file we wanted! Jim was even able to send images to England, where the client is located.

Since 24-bit files, even at video resolution, can be quite large, we nearly always used JPEG compression on image files before transmitting them. I used Pegger exclusively because of its speed. It is many times faster than using an image processing program because the conversion is direct.

CREATING THE OBJECTS

My work turned out to be more problem-solving than anything else. I often only had a general idea of what was required, and it was up to me to come up with a solution. In many instances I used techniques I'd read about, and just tweaked them to suit the situation. For example, for a "cloudy" looking object, I based its surface on a tutorial I had for animated fire, and just modified the surface settings. It came out looking really nice, although we ended up not using it because it was too busy for the scene.

For this project we also needed a fairly detailed satellite. Modeling it was not too difficult, but Jim was very concerned about getting the right look for the gold foil that covers most of its surface. I thought about it for a while and even scrutinized some aluminum foil.

Now, if you dismiss the reflective properties of foil, it is just a relatively flat surface with some crinkles in it, very similar to crinkled paper. Scala MM just happened to come with such an image, although it was designed for a presentation background. I used ADPro to convert it to grayscale and saved it as a 16-color image. Then using this image as a diffusion and bump map and applying the appropriate gold color and surface attributes...*voila!* gold foil!

There was also a need for a human object. We began by using Humanoid; however, the one big problem with it is that the models are not clothed. Jim suggested I try to surface what would look like a T-shirt on the model. The result was pretty bland, so I went on a search. Eventually, I found a tileable texture image that looked like woven material on Syndesis's 3D-ROM CD, which I tiled to full-screen using DeluxePaint. I then modified the T-shirt surface using a grayscale version of this as a diffusion map and changed the color. The result was stunning—it looked like a Christian Dior sweater. The only thing missing was the logo! Sadly, the client nixed the guy because he was "too cool!"

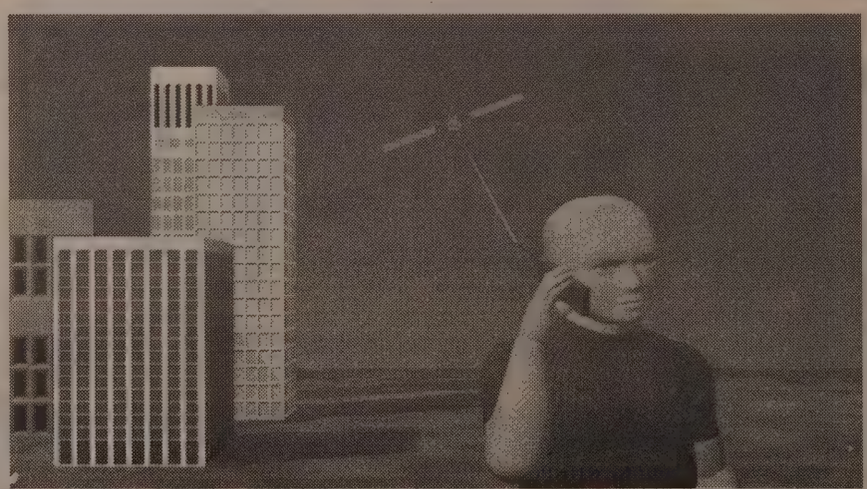
We ended up settling for a man in a business suit, which was a highly modified version of an object from 3D-ROM. Since the original model was sitting reading a newspaper, I had to remove the extraneous pieces (i.e., chair, newspaper, etc.). His sleeves would not bend properly using the existing polygons, so I cut out just his shoulders and extruded the bottom using three segments to create a new sleeve. After manipulating the points separating the segments, I was able to acceptably bend it at the elbow.

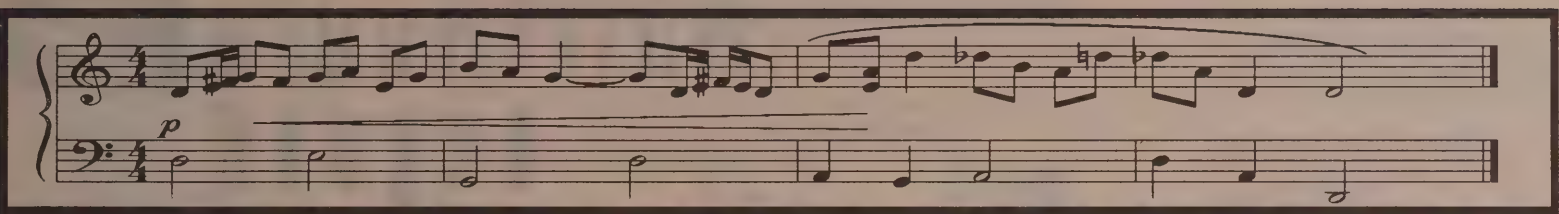
Also, the original hand was pretty ugly, so I replaced it with Humanoid's hand. Since I already had the Humanoid hand perfectly keyframed holding a phone, I saved it and the phone using the "transformed" object save. These were merged in Modeler, recentered to 0,0,0, and loaded back into my new scene. The hardest part of integrating the new man into the scene was the fact that he was made to an entirely different scale compared to the Humanoid hand. I had to just eyeball it until it looked right.

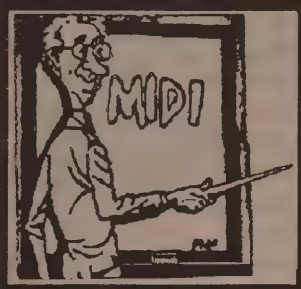
Buildings were also on the list of objects to construct. In retrospect, the technique I used seems almost too easy. All I did was draw one side of several buildings in 16-color grayscale in DeluxePaint. I depended heavily on the snap-to-grid feature to get symmetrical windows and other features. I used lighter shades for features that should be raised and darker ones for indented features. Using these images as diffusion and bump maps on simple box objects, I had (relatively) instant buildings. The great thing about this technique is that it is easy to change the building color as well as its shape.

AMIGA ADVANTAGE

I needed to be as efficient as possible with my time and get the most out of my equipment. Therefore, a lot of things got done while I was asleep or at work, and I took







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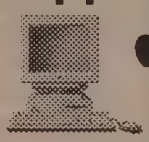

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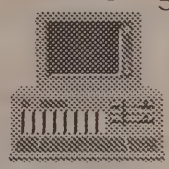

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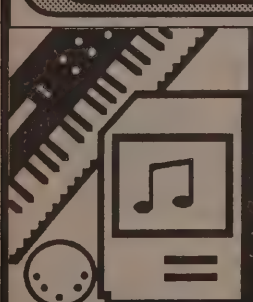

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full advantage of the Amiga's multitasking abilities. My main setup consists of an Amiga 3000 and a 4000, networked using AmigaLink. The 4000 has a Toaster in it, and I have the standalone LightWave on the 3000. The 3000 has a 500MB hard disk partition that's dedicated to storing rendered image files.

Because rendering the LightWave frames to a network device from the 4000 would be very slow, I rendered them to RAM:. An ARexx script I wrote runs in the background, monitors RAM: for finished frames, and moves them to the 3000's hard disk as they are completed. In fact, I had another ARexx script that automatically rendered specific test frames at high resolution, executed my "background move" script, and then rendered every other frame in the scene at low resolution.

My 3000 was sometimes simultaneously rendering a different scene and saving frames to the same hard disk partition. I wrote another ARexx script that executed MagicLantern and automatically compiled all of the rendered frames into a 16-bit animation that I could view on my Retina. This script was executed using a scheduling program at a time I figured all of the frames would be finished.

Other times I had Rend24 intercepting rendered frames and converting them to DCTV images. I then used MovieMaker to view a DCTV animation, which gave me complete playback control.

Jim used the Toaster's genlock to record test Amiga animations to tape with similar success. (The final frames will be rendered using a Raptor in NTSC and PAL resolutions. These will be saved to Exabyte tape and then single framed to video tape. I can't wait to see the final product.)

As you can see, ARexx played a big part in all of this, and by its very nature requires real multitasking. Many programs have a macro language, but ARexx can simultaneously control more than one application. However, perhaps a more important advantage is that except for specific commands used by the applications being controlled, there is a consistent ARexx language. You don't have to learn one macro language for this and another for that.

Many programs have a macro language, but ARexx can simultaneously control more than one application.

PLAYING IT SMART

When working on a project of this magnitude, you need to be very organized. I set up a special directory for the project and assigned "3-DProj:" to it. All of the scene files went here, and separate subdirectories stored finished objects and images.

Whenever I loaded an object or image into a scene, I always used the assigned name and not the full path. This makes the scene portable, so it can be rendered on any Amiga, by simply assigning that name to the appropriate directory.

Another thing you should do when modeling is to keep saving at each step. Using the same main file name with an incremented numerical extension works well (e.g., Phonebase01, Phonebase02, ...). If the object is made up of different parts, you should save these individually, as well as any Boolean cutting objects you use. I'd usually set up a special subdirectory to hold all of these related files. Only the final object was copied over to the main project-object directory. You never know what modifications will need to be made later on, and it's great not to have to start from scratch.

You should also back up frequently. Tape is the only serious solution; SCSI tape backup units are available for a few hundred dollars. I picked up an internal 16GB DDS-2 DAT drive for under $1000. You can back your drives up at night; because the Amiga multitasks, you can even do this while it is rendering. Think of it this way: if you've just spent days perfecting an object, how much is it worth to you to get it back, if it suddenly disappeared? Personally, I'm a "backup fanatic" and have five sets of full backups, so if one fails I can fall back on a previous backup. I also do frequent smaller incremental backups of changed files to a Syquest cartridge.

A REAL PROJECT

There is nothing like working on a real project when it comes to learning. You'll find you retain much more information than if you were just doing it for your own personal enjoyment. I ended up taking a self-taught crash course in LightWave and learned more in a month than I ever knew.

Moreover, the need for good 3-D animators is growing exponentially. Take a look at the TV commercials being aired any evening. Nearly all of them seem to use 3-D animation to some degree, and maybe half are entirely animated. A project here and there could help pay for your Amiga.

Good luck and have fun! ■

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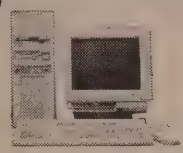

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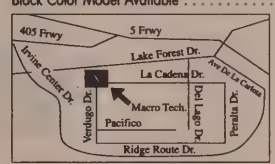

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MULTIMEDIA 101

Further Adventures On The Path To The Perfect Processor

To Recap: The purpose of this column is to explore the various issues of the multimedia world—to examine what's possible, what's not, what's hype, and what's hope. In that spirit, and bearing in mind that some industry figures predict that multimedia is the killer app that will finally get PCs into the legendary and much-desired Sixpack home, I set out last month to buy a computer that would allow me to partake of multimedia experiences. As much as possible I attempted to do this as Joe or Jill Sixpack might if they had fallen prey to the hype that multimedia is the only thing between them, creative bliss, and educational entertainment. Okay, so Joe and Jill are probably not that dumb, but the hype is—just read the ads in *Wired* or the editorial in many glossy monthly computer magazines.

I tried to make the task easier by ruling out the entire DOS and Windows world. I knew I could save some money or get some extra power by going for the operating system from Redmond, but the Cupertino CPU has the reputation for greater ease of use and reliability—and it was my money and time I was spending! (However, I'll be happy to evaluate any Windows machines that arrive freight-paid on my doorstep despite my provocative comments about what it takes to make them do their job and their lack of aesthetic appeal.) Even having made that immensely time-saving decision, I was on the quadruple horns of a dilemma that caused me to change my mind repeatedly, suffer absurd anxiety, and question whether the Sixpack family will ever go through the computer-buying process as it is now.

Those quadruple horns are the four Macintosh families—and the strangely similiar but somewhat offset configurations various members of those families come in.

SOME HESITANT STEPS TOWARD A NASTY LITTLE SECRET

I'll immediately grant that computers are complex, that the business behind them is Byzantine, and that

BY JONATHAN E

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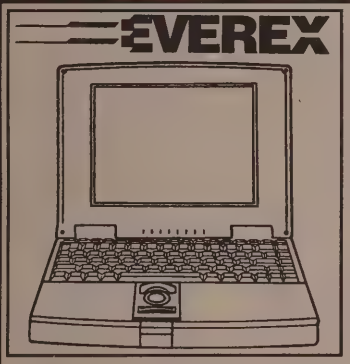

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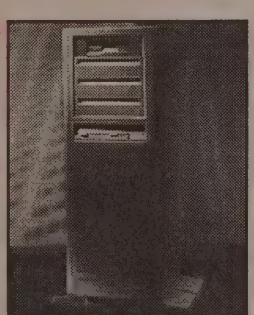

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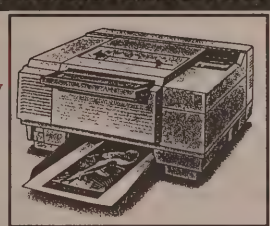

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product cycles are short, but it's hard to believe that Cupertino computer company is doing all it could to be consumer friendly. So far its long-term hardcore adherents have kept it afloat.

However, my experiences in the retail trenches leave me doubting that the execs in Cupertino "get it" when it comes to enticing substantial numbers of new converts. Sure, they've got the competition almost licked in some professional areas; but when it comes to domestic consumers, who may be thought of as optional users, I'll guarantee that some of them turn tail and flee in confusion from the entire undertaking, or fall into the Windows pane. After the purchase is made, the customary niggling doubts of buyer's remorse, together with subtle dissatisfactions caused by minor design flaws and overblown promises, gnaw at pride of ownership and customer confidence.

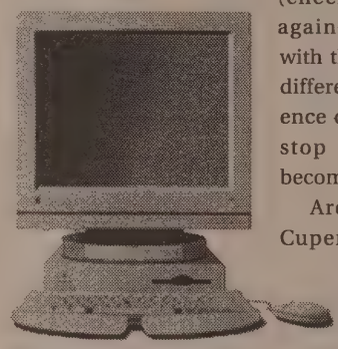
My purchasing decision was complicated by the current situation with Apple and its introduction of the Power Macintosh line of RISC processors. I simultaneously wanted both to be a doppelganger for the Sixpacks and to get a machine that could handle the increasingly power-hungry applications and operating systems of the future. And that's the nasty little secret behind the lower-end machines that the Sixpacks might be tempted to take home with them—they'll run CD-ROMs, they'll do simple accounting, word processing, and kids art projects. But it's a big stretch for them to do the hyped-up home multimedia complete with video and sound that a budding hobbyist or family archivist might want to do.

And, in the future, well, who knows how the upgrade paths will work out?

THE WONDERFUL WORLD OF PERFORMAS

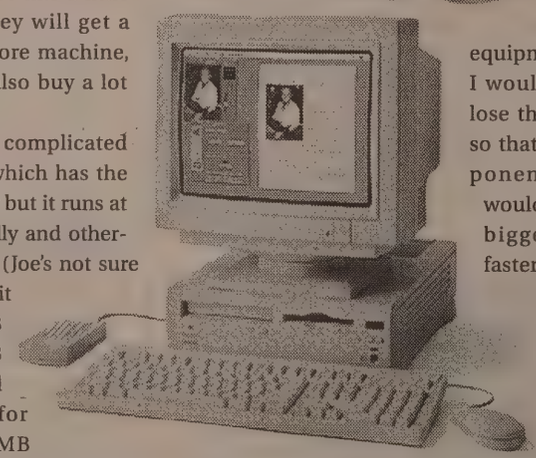
So, Apple currently offers the four families: Performas in a bewildering array of configurations that apparently are sometimes found exclusively in the stores of one particular chain; two models of Quadras; the Power Macs; and the PowerBooks.

As a Sixpack, there's little doubt that I'd be drawn towards a Performa. Let's face it, there's a lot to be said for getting pretty much everything you need in one box. But how would you choose between a Performa 475 with a 25MHz 68040 processor, 4MB RAM, 160MB hard drive, and no CD-ROM drive at $1299 and a Performa 550 with a 33MHz 68030 processor, 5MB of RAM, the same 160MB of hard drive but with a CD-ROM for $1599? Just to add to the trickiness, the monitors are different. Okay, for $300 you might as well get the CD-ROM drive along with the complimentary software, the extraMB of RAM, and the extra speed. But wait, isn't the 68040 a better chip than the 68030? So how come it's only 25MHz instead of the 68030's 33MHz? And how come this other spec sheet says it's really a 68LC040 chip? And this was so close to being a no-brainer!



Assuming Joe doesn't decide to head for the beer at this stage, he might throw the Performas 575, 578, and 630 into the mix. The 575 runs about $1900 with a 68LC040 33MHz processor, 5MB of RAM, and a 250MB hard drive. The 578 runs about $2100 and offers the same processor plus 8MB of RAM and a 320MB hard drive. Both have CD-ROM drives. Looks to Joe like a little bit more money will get a fair amount more machine, but $200 will also buy a lot of beer.

It gets more complicated with the 630, which has the same processor but it runs at 66MHz internally and otherwise at 33MHz (Joe's not sure about this) but it comes as a 4MB model, 250MB hard drive, and no CD-ROM for $1499; an 8MB model with the same hard drive, but with a CD-ROM drive for $400 at $1899; or again 8MB of RAM, a 350MB hard drive, CD-ROM, and TV (now Joe's excited!) for $2399—but the monitor's not as good as the 575 or the 578.



When Joe figures all his options, adding external speakers (which he'll need), adding extra RAM, getting a model without a built-in CD-ROM drive but using an external one (which comes in a "multimedia" kit with those speakers and some headphones for about $450), and balances the features of closely competing models (check the 578 with 8/320 against the 630 with 8/250 with their speed and monitor differences for a price difference of $200), Joe is likely to stop being a Sixpack and become a Case.

Are you listening in Cupertino? This is a totally absurd state of affairs. It's closer to Three Card Monte than a way to build consumer confidence.

CUT TO THE CHASE

Despite appearances and occasionally my behavior, I'm not quite a member of the Sixpack family. While both the Performa 578 and one of the 630s tempted me sorely (they are relatively cheap), I eventually decided that I wanted a component setup so that, if one piece of equipment were to fail, I wouldn't necessarily lose the whole rig, and so that individual component upgrading would be easier (e.g. a bigger screen or a faster CD-ROM drive).

As I mentioned in last month's column, the Power Mac 7100 and 8100 were totally out of my budget. I halfheartedly looked for a second-hand machine along the lines of a Quadra 660, but saw only slower, older machines at what seemed like overly optimistic prices for the sellers. In the current model Quadras, the 605, although bundled with some software, is

Top to bottom: Quadra 605; Power Mac 6100; Performa 630

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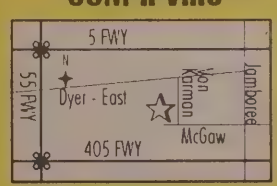

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totally outwitted by the Quadra 630, which is definitely faster and either bigger or comparable in price, subject to the same jiggery-pokery that infests the Performa world!

I had a mad passion for a PowerBook 520c, although I may have settled for a black-and-white 520 after the arithmetical dust settled. I could overlook its 68LC040 processor in favour of its sleek portability and the fact that I could run both a large screen and a CD-ROM drive off it. But it would have been something of an extravagance at about $2700 for a mere 4MB of RAM. By the time all the necessary additions were in place, the total would be over my stomach-queasing $4000 limit (which is surely far over what the Sixpacks would consider reasonable).

Once again, those devils in Cupertino were tempting me to spend just a bit more to get something with quite a bit more flash! I don't know whether I could have resisted or not. Thankfully, the week I just *had* to get the computer into the house, there were no PowerBook 520c's to be found in Northern California. However, the PowerBook option is still open as a second computer when the economic microclimate improves.

So ultimately the choice came down to a Quadra 630 or a Power Mac 6100.

AND THE WINNER IS . . .

The basic Quadra 630 configuration is 4MB of RAM with a 250MB hard disk at an approximate cost of $1250. The basic Power Mac 6100 comes with 8MB of RAM (remember that it needs more too) and a 160MB hard disk for around $1600. Both machines need to be pumped up with more RAM. By the time you've done that you're looking at a very narrow proportionate price gap. I never did actually figure out what the Quadra would finally cost because, when I realized what a minimal price gap there is, it seemed irrelevant.

About the first bit of advice I got when I embarked on this quest was that Power Mac was the way to go if I wanted to look toward the future. Subsequent to that I received other contrary advice and, of course, wanted to go through the Sixpack role-playing; but the PowerMac came out ahead when it came time to part with the ducats—or, more accurately, the bank's ducats. However, it was only one relatively minor difference between the two machines that finally tipped me toward the Power Mac—the Power Mac has 16-bit sound while the Quadra 630 has only 8-bit.

I've been told that most software only supports 8-bit sound; I've been told that the limiting factor to the machine's speed will most often be the CD-ROM drive; I've been told that old applications will run too slowly under the Power Mac's emulation of the 68000 series; but none of that matters when you consider what the Macintosh world will likely be in six months or a year. We all know how fast things move in the

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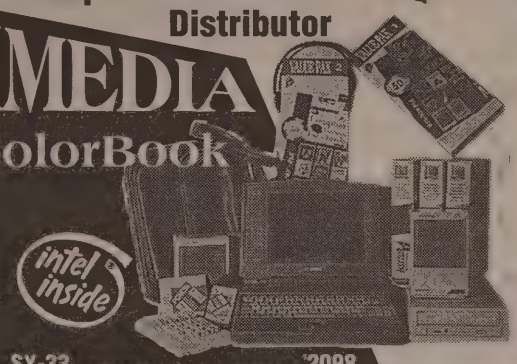

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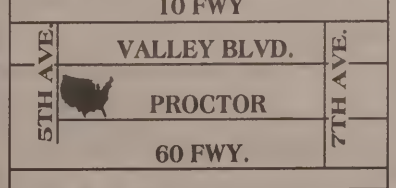

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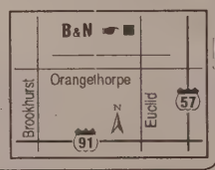

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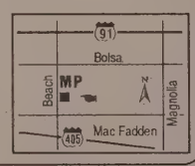

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computer business, but they usually move fast forward rather than fast back—I think it unlikely that there will suddenly be a vast surge of interest in applications for 68000 series machines.

One other important factor was that there is at least the theoretical possibility of looking at Windows CD-ROMs by using Insignia Solution's SoftWindows to emulate Windows. From the point of view of a reviewer, this is a valuable option, since there are a number of CD-ROMs only available for Windows. I'll be letting you know how this works in future columns.

As I write, I've barely set the machine up—there are a ton of new things to figure out. I have some minor complaints. I'll discuss those, the good points, and the general experience of the computer in the next column. As a writer, I can tell you that running Microsoft Word under emulation appears to be no problem at all.

THREE BITS OF ADVICE FOR THE COMPUTER BUYER

If you're off on your own purchasing expedition, I have three suggestions:

1. Read a book and catch up on the general state of the market. I used *Macworld Complete Mac Handbook + Interactive CD* by Jim Heid, published by IDG Books. Heid explains plenty of basic things, such as what all the different chips mean and how various members of the Macintosh family are related; he also covers standard applications and multimedia capabilities. I found it very useful, and it looks as though it will have a decent shelf life. I also perused the glossy monthlies, *Macworld* and *MacUser*, which at the time had fairly ample coverage of the Quadra 630. Some months will not have much of use in your buying search, however.

2. If you're tempted to save some bucks on a third-party keyboard, try it out. Along with the screen, the keyboard is where you do most of your interacting with the computer. It's not worth saving $70 or so for a crummy keyboard, or even just a clunky one. Thanks to Gary Davi of Whole Earth Access for this valuable lesson.

3. Haggle mercilessly. While you should be prepared to trade price for some service, don't be afraid to ask the salesperson to match the advertised price of another store. Yes, use this very magazine to find the best price and ask your local store how close they can get. But don't forget that niceness counts!!! ■

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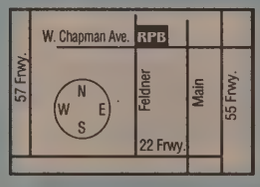

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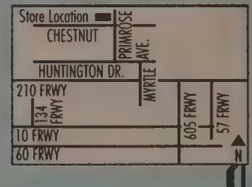

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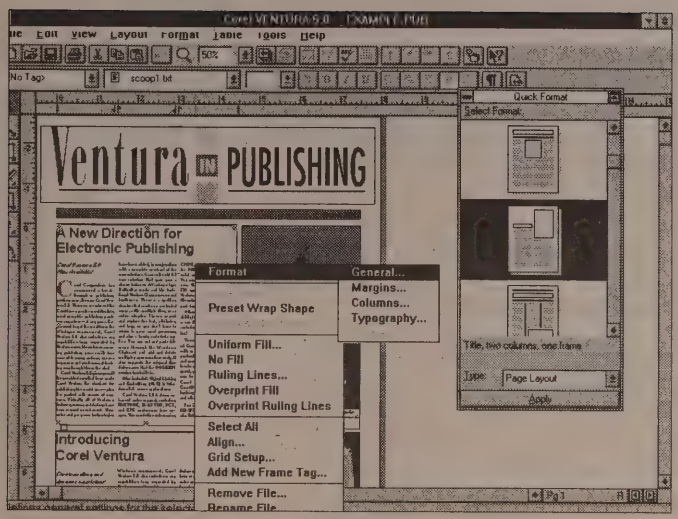
High-End Desktop Publishing Packages For Windows

A Comparative Survey



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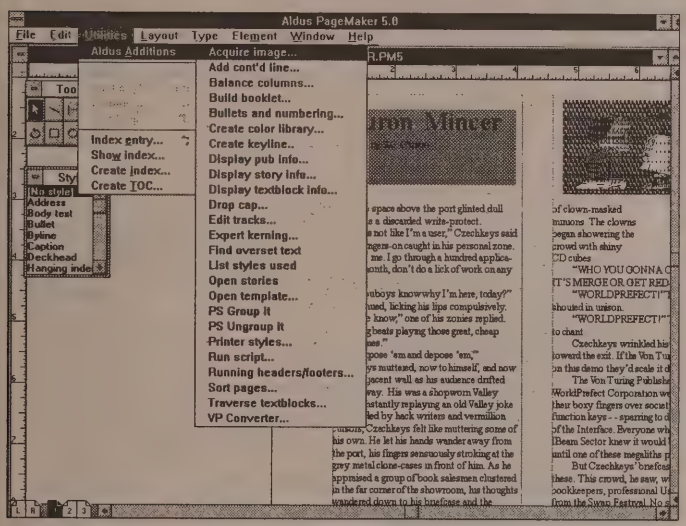

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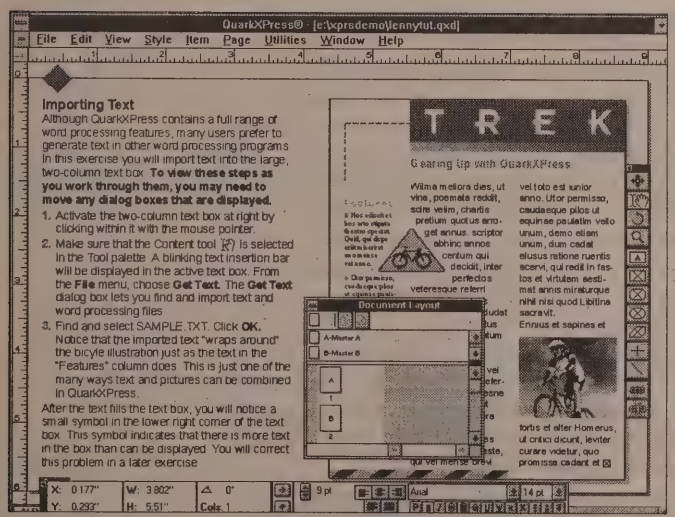

The state of the art in desktop publishing changed very little during the past year. But changes now visible on the horizon may presage a shift in the "Big Three" balance of power.

With the failure of Xerox's Ventura Publisher to successfully make a transition to the Windows and Macintosh platforms, QuarkXPress supplanted PageMaker in 1994 as the number one high-end DTP package. This was due largely to Quark's superior handling of large documents, its precision controls, and the added flexibility of its interface.

In the past two years, the advent of low-end DTP packages like Microsoft Publisher, and the evolution of word processing packages like WordPerfect and Microsoft Word, have established a new, specialized niche for the more expensive Quark and PageMaker. In 1993, high-end desktop publishing programs developed sophisticated color-management features, and a series of special add-on enhancements to offset the competition from low-end packages.

Now Corel Corporation has reentered Ventura Publisher into the competition, with an enhanced, greatly improved version that may escalate the competition between the high-end survivors in the market. After almost a year of nothing but maintenance upgrades from Aldus and Quark, we may soon see new versions of their products that try to catch up to Corel's substantial interface and feature innovations.

The advantages that the "high-end" desktop publishing packages offer over "low-end" packages and smart word processors are their

BY LENNY BAILES

automation and control of specialized page layout and printing tasks. If you want to produce a magazine with eye-catching graphics, multiple colors, and special layout effects, the high-end packages make it easier to place elements on the page, designate specific color separations and ink combinations, adjust the appearance of type, manipulate the sequence of story-text in the publication, generate running page-headers, and place graphics directly from your scanner. QuarkXPress and Ventura Publisher are also particularly wellsuited to the production of technical manuals and book-length manuscripts.

What you don't need high-end DTP packages for, anymore, is the mom-and-pop newsletters and brochures that originally spurred so many DTP sales. There are now quite a few word processors and low-end packages that will do the job for a home user at considerably less expense.

For those who seek professional-level publishing tools, each of the "Big Three" DTP packages has its particular strengths and weaknesses.

PAGEMAKER 5.0

Pros: PageMaker has the simplest engine of the three packages. It's easier to master all the options. The features don't always have the depth of control that Quark or Ventura offer, but they're easy to find and easy to apply.

Standout features in the basic package include three-level index generation, and six different color management systems. Benefits offered in PageMaker additions are the ability to generate running page-headers, sort pages and build custom booklet formats, and expert tracking/kerning options.

Cons: PageMaker is the least able of the three to handle the production of longer documents; its text autoflow feature works only on full-page blocks. PageMaker has no built-in support for two-color gradient fills, and a meager collection of pattern fills. Fills and built-in image controls apply only to black-and-white bitmaps; they don't work on greyscale or multicolor graphics. The package has no built-in footnote feature (footnotes must be typed in manually on a page-by-page basis).

PageMaker is the classic interface for desktop publishing. It consists of a page display and pasteboard area onto which you can construct or import various layout elements. The left and right master pages are used to place repeating elements that will appear in all pages of a publication.

Story text is placed on the page by importing a file composed in a word processor, typing text directly onto the page, or using PageMaker's Story Editor. Smaller text "stories" are normally placed on a page-by-page basis by clicking with the selection tool and dragging out the size and shape of the text block on each successive page. A large story can be placed automatically, but only into full-page text blocks. Any other layout arrangement must be composed by turning to each successive page and manually arranging the size and shape of the text block.

The story editor contains a series of word processing features, allowing you to perform spell-checks, search and replace text, or give specific formatting instructions (font, paragraph style, type style, etc.). Spell checking can be performed algorithmically or from a specified hyphenation dictionary. Seventeen document templates for newsletters, brochures, address lists, labels, etc. are included in PageMaker's "Open Templates" addition.

The package includes a series of other "Additions" enhancements accessed from PageMaker's "Utilities" menu. The Additions include a number of useful supplementary features for text management, color management, graphic management, and typographic control.

The basic PageMaker features include standard paragraph stylesheets, sixty-five import filters, a table editor that can import and manipulate Excel and Lotus 1-2-3 spreadsheets, and a toolbox that can draw simple lines, ovals, and rectangles, as well as skew text and graphics.

OLE 2.0 linking is supported for files from Windows-compatible applications. (On the Mac, PageMaker also supports the System 7 Publish and Subscribe features.) The package includes an online user tutorial that covers DTP basics, and a series of "getting started" manuals and a command-reference. The documentation is well written and attractively laid out.

Note: Although the package does not include filters for Word for Windows v6 or Excel v5, these can be downloaded from the Aldus BBS, along with a nifty Addition that automatically converts Ventura Publisher v3/4 files into PageMaker publications.

COREL VENTURA PUBLISHER 5.0

Pros: Great user value: base-package includes seventeen thousand clip art images; 650 fonts; seventy-five style sheets and templates; Adobe Acrobat Reader; a pared-down version of Ares FontMinder (an excellent font management utility); and a series of other Corel Applications, Mosaic (a graphic file manager), PhotoPaint (a bitmap image design program), DB Editor and QUERY (a database manager and table-generation tool), Equation Editor, and Corel Kern.

Improved interface featuring pop-up menus and roll-up dialog boxes. Amazing built-in color fills, special effects, line and box drawing features. More zoom document views than either competitor. More supported import/export formats (including latest versions of Word, WordPerfect, Excel, etc.), powerhouse table-editing, footnotes. Style sheets and style tags for paragraphs and underlying frames.

Cons: More intricate interface, contains a multitude of fine-tuning controls that may cause some right-brained designers to space out. Still edits only one document at a time. Requires 8MB of RAM, minimum (Corel suggests 16MB). Graphic frames all on one layer (send-to-front/send-to-back works only for lines, polygons, and boxes) .

Corel Ventura 5 turned out to be a pleasant surprise for me. In the days of the GEM interface and Ventura v3, this was my favorite computer program of all time, bar none. In the words of Corel's accompanying PR release: "For years Xerox Ventura Publisher was king of the desktop publishing industry, known for its power to creative structured, text-intensive documents...but neglect by its previous owner, Xerox Desktop Software, and a poor port to Windows tarnished its crown: width tables made font management difficult, there were too many non-Windows keystrokes for common commands, too many menus to do simple tasks... Xerox never fully adopted the Windows interface to its GEM-based Ventura Publisher."

With v5, Corel has revised and greatly improved Ventura's interface, banishing the troublesome width tables, and including state-of-the-art features that may have Adobe/Aldus and Quark scrambling to keep up. The confusing icon toolbars of v4.2 have been replaced by a useful toolbar that is clearly captioned with pop-up function descriptions (similar to Microsoft's Word for Windows, or Apple's Balloon help).

Ventura Publisher has always included more options and text adjustment features per square inch than any competing product. The plethora of nested menus and dialog boxes has been supplemented in this version by convenient "roll-up" tool bars—a very Xerox/Macintosh-like innovation. Corel also makes good use of the right mouse button, allowing you to click anywhere on the screen and pop up a portable menu of context-sensitive options. The pull-down menus themselves now use the same tabbed dialog boxes that Microsoft developed for Word and Windows '95.

The underlying metaphor in Ventura Publisher is to draw or generate "frames"—containers for text or graphic material, which are placed automatically after the underlying document structure is established. The designer can then go back and make minute manual adjustments to the layout. The idea with Ventura is to preload the text files and graphics that you intend to use in a publication and pour them into a document one-by-one from list boxes within Ventura's editing screen.

Version 5 continues the shifted emphasis of the last two versions toward complete publication files that can contain a large number of

continued on page 196

RESOURCES:

PageMaker 5.0, $895
Aldus Corporation
411 First Ave. South
Seattle, WA 98104
(206)622-5500

Corel Ventura 5.0, basic package $595/diskettes, $495/CD-ROM, with CorelDRAW $895/diskettes, $695/CD-ROM
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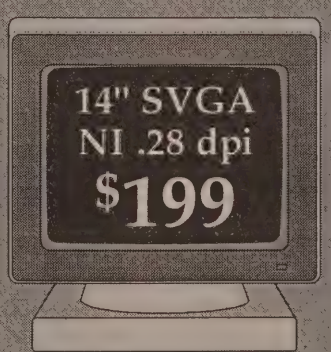

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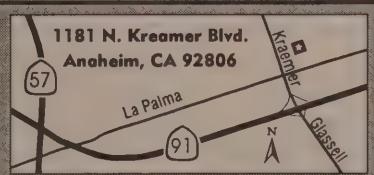

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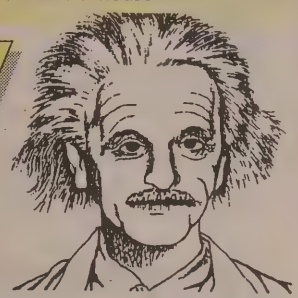

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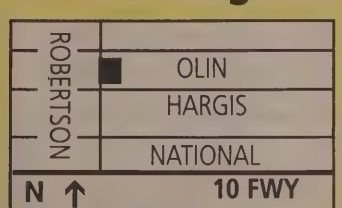

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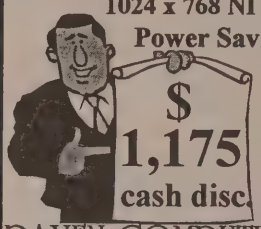

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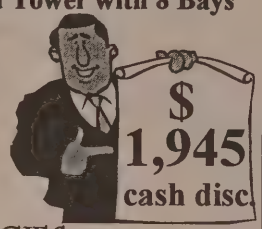

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continued from page 192

individual chapters. The program default is now to open and work with publication files, rather than individual chapter files.

Corel Ventura has also caught up with a few other features from its competitors. Text can be set to flow around irregularly-shaped objects either manually or in six preconfigured patterns. The Quick Format roll-up is more flexible than Quark's Document Layout Palette, allowing you to quickly change document templates, column formats, colors, or paragraph styles from a floating toolbar. The Ventura color separation utility is fully integrated into the base package, allowing a choice of four color management systems. The online tutorial features ten complete lessons, and is more extensive than the tutorials bundled with PageMaker and Quark.

Corel Ventura now includes both display and printer calibration utilities that allow you to synchronize the colors of your monitor and printer to the closest possible color match for Pantone, TruMatch, or FOCOLTONE catalog systems. The full range of fill options available in CorelDRAW is also available in the Corel Ventura toolbox, even if you don't own a copy of DRAW. (This was, to me, the most impressive feature of the new release.) Users can also elect to buy Corel Ventura 5 in an integrated bundle from Corel that includes CorelDRAW and and its attendant supplemental applications: CorelTRACE, CorelCHART, CorelSHOW, CorelMOVE, and twenty-two thousand pieces of clip art.

Note: Corel Ventura 5 requires a minimum of 8MB of RAM. On the 16MB Pentium system I used as a test base, response time was more than satisfactory, but I suspect that on an 8MB 486, performance may be less than brisk.

QUARKXPRESS, V3.3

Pros: Extends PageMaker's easy-to-use pasteboard metaphor with multiple master page templates and a series of document and tool options. Offers fine control (to thousandths of a point) of text and graphic placement on the page.

The package is well suited to poster design, with all-caps, shadow, outline, and strike-through styles provided in addition to standard typestyle options. The drawing tools include irregular polygon construction. Quark also has the best tools for color trapping in the industry. (See the sidebar glossary for details.)

Cons: Instead of a full-course meal, Quark is strictly a la carte. In order to have a number of basic text-management and layout tools, you must purchase additional third-party "XTensions."

The basic Quark has no support for creating headers and footers, creating footnotes, generating an index or table of contents, editing tables or spreadsheets, establishing cross-references, or figure captions. All of these tasks require individual XTensions that cost from $100 to $300 apiece. Quark is targeted toward high-end special niche markets, so it includes no clip art or document templates with the package. Import filters available from third parties are not yet available for current versions of some popular PC applications (Excel 5, AMI Pro 3.0, Word for Windows v6).

QuarkEXPress is a hybrid of some of the best features of PageMaker and Ventura Publisher, which may partially account for its growing popularity on both PC and Macintosh platforms. To the basic page and pasteboard, Quark adds the ability to pour elements into underlying "text boxes" and "graphic boxes." Unlike PageMaker, Quark permits text to flow automatically from a box of any size or location on the master page to automatically duplicated boxes on successive pages.

The Quark Control Palette allows fine placement of text and graphic boxes by typing in coordinates. The Control Palette also provides quick access to typestyles, paragraph alignment, and the box rotation feature. "Runarounds" (text-wrap around irregular objects) adjust themselves automatically as you move a graphic box around on the page.

Quark paragraph styles are edited on a more piecemeal basis than comparable styles in PageMaker and Ventura. Instead of setting all paragraph defaults from a single dialog box, you must successively choose a series of pull-down menu options to modify a style. (The most important ruler and spacing defaults are included in one menu item, but baseline adjustment, character fonts, and tab settings are all specified from separate individual pull-down choices.)

The individual tools in the Quark toolbox are all highly adjustable. Sophisticated users may pre configure the size and shape of element boxes, and modify the defaults of the content and drawing tools.

Without third-party extensions, Quark can import and establish links to objects

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from OLE 2.0 compliant applications in graphic boxes, rather than as editable data. Hyphenation decisions are made by algorithm, rather than dictionary, although you can set up a special exceptions dictionary to complement the general hyphenation algorithm. Quark has no story editor, per se, as do PageMaker and Ventura, but you can run a spell-check, and it's easy to search and replace text or font codes within individual text boxes.

Quark currently supports more management systems for process and spot colors than its competitors. It can print separation plates containing all colors used in a document, or produce plates one color at a time. (PageMaker and Corel Ventura both allow you to print partial plates that contain more than one specified color.)

Perhaps the strongest feature of the package is its ability to superimpose up to 127 master pages over a document. This allows a designer to quickly modify the appearance of a document, and easily produce a series of variations on short notice. ■

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Desktop Publishing Glossary

LAYOUT

Master Page: A control page which duplicates all placed graphics, text, and other layout elements on each page of a document. Ventura Publisher doesn't use master pages. PageMaker permits two per publication, and Quark Express lets you switch among up to 127 different templates.

Runaround: The ability to make text flow around an inserted graphic in a natural and symmetric way. PageMaker, Ventura Publisher, and Quark all now possess this feature. Quark creates the simplest, most automatic runarounds—Ventura Publisher includes a number of preset runarounds to flow text in interesting geometric shapes. PageMaker, once the champ at this maneuver, now has the most cumbersome implementation.

Template Document: A preformatted sample document that can be used to create a specialized publication like a newsletter, brochure, or technical report. Template documents usually include specific column settings with placeholders for graphics and headlines. Ventura Publisher currently offers the widest variety of template documents.

TYPOGRAPHY

Tracking: The ability to vary the space between individual characters and words in a specific font.

Kerning: The ability to alter the space between pairs of characters in headlines and chapter titles to make text look more natural or pleasing to the eye. High-quality PostScript fonts often include special kerning tables from the designer to improve the appearance of specific character combinations. All three packages permit these values to be used when present, edited, or manually overriden. PageMaker has the strongest support for kerning and tracking, with many options, including an expert override feature in its additions.

GRAPHICS

Tints: Different shades of a single color (the color mixed with varying percentages of white) are called tints.

Process Color: To reproduce scanned photographs and images accurately, their colors are "processed" and divided into different tints of four different inks, cyan, yellow, magenta, and black.

Spot Color: In addition to process colors, all three reviewed packages allow you to designate colors based on premixed inks. There are several industry-standard systems for specifying exactly the color you want by a common catalog number. (Pantone Matching is the most widely used of the standards.) All three packages include the ability to specify whether your documents will be printed using process colors or spot colors and to convert spot colors into their process equivalents. PageMaker and Ventura Publisher allow you to print partial separations with a combination of colors. Quark can print either all of the separations or one at a time.

Gradient/Fountain Fill: A non uniform color background for a graphic used to reflect lighting and other special effects. Ventura Publisher includes a wide variety of these fills. Quark allows you to create solid and gradient fills that blend a pair of colors, and PageMaker is limited to solid fills of one color or a limited number of monochrome cross-hatch designs. (Quark does not include any bitmapped pattern designs.)

Trapping: When two objects of different colors in a publication overlap, the one specified as the top layer usually "knocks out" a portion of the underlying object. Because of registration problems in printing, gaps sometimes occur at the intersection boundaries of the two objects. Trapping is a technique for extending or shrinking one of the objects to create a small over-printed area of intersection. This area is assigned a color blended from the individual colors of the two objects. Quark and Ventura include automatic trapping features. All three packages have tools to allow sophisticated users to manually set up a color trap. ■

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Upgrade Paths To PowerMac

Options For The Age Of RISC

Do you feel left out in the cold in the bright new world of PowerPC computing?

As of September 8, 252 native PowerPC applications were released, including Microsoft Excel. By the time you read this, there will be many more.

If your Mac is still too healthy and functional to deserve a trade-in, there are reasonable—even easy—upgrade paths from the CISC (complex instruction set computing) of 680X0 to the RISC (reduced instruction set computing) of Power Macintosh: the Power Macintosh Upgrade Card and a series of Logic Upgrade Boards.

You may not easily find the Upgrade Card on dealers' shelves, as it may be perceived as a service item rather than a component. The Apple price for the Upgrade Card is $699; the Logic Board for a 6100/60 is $999. At street/mail order prices of just over $600, the Upgrade Card is definitely a good bargain for the budget-minded multimedian. The card includes a PowerPC 601 RISC microprocessor, it provides an integrated floating-point processor (good for graphics) and 32K cache, and will run at twice the clock speed of the upgraded Macintosh. It has 4MB of Power Macintosh ROM and 1MB on-board level-2 cache.

PowerPC enhancements include from two to four times performance improvement for integer operations, and up to ten times for floating-point-intensive operations like graphics applications. For an application like Premiere, which uses a lot of QuickTime, QuickTime itself draws directly to PowerPC anyway, so a card upgrade will support about as much performance as a logic board will.

Apple has announced that upgrade cards and boards will be released for Performas soon, so that almost everyone who wants to be able to go native can do so. Of course, just as many users can continue to be happily productive with their existing configurations.

LOGIC BOARDS

The six Logic Upgrade Boards are more specific to the target Power Macintosh systems. The logic board will

BY TONY REVEAUX

be slightly faster than the Upgrade Card in the same machine. The upgrade board doubles the clock speed of the original computer. The logic board, in addition to giving somewhat better performance, provides the different ports and delivers the functional equivalent of a full Power Macintosh. The AV logic boards not only offer the means to upgrade to PowerPC, but also to the Mac AV (audio visual) feature set. For some users, the AV alone will make the upgrade worth the price; sales reports suggest that most people are going for the AVs when they go for a board.

Three AV logic boards accommodate different models of Macs. They provide AV capabilities including extra RAM, VRAM, and S-video to composite video ports. The AV capability can add from $10 to $100 more to the same logic board for a given model. The upgrade card is easy to install,

THE UPGRADE BOARD DOUBLES THE CLOCK SPEED OF THE ORIGINAL COMPUTER.

but logic boards should be taken in to an authorized Apple reseller for installation. The motherboard is modified to receive the logic board, which replaces certain components as it adds others. At dealers like MacAdam in San Francisco, installation is included at no extra charge when the unit is bought from them.

UPGRADE CARD

Installing the Power Macintosh Upgrade Card is not much more difficult than removing the cover from the CPU. The kit comes with all the hardware you'd need to upgrade a Macintosh Quadra 610, 650, 700, 800, 900, or 950, or a Centris 610 or 650 computer. You must have a minimum of 8MB of RAM to support the PowerPC, but then, you need at least that much memory to do any serious work nowadays anyway.

For the Centris 650/Quadra 650, 700, 800, and 900, installation involves no more than inserting the card into the processor-direct slot on the motherboard. For the Centris 610 or Quadra 610 computer, you need to connect the Power Macintosh Upgrade Card to the angle adapter that is included with the kit. A similar strategy is used with the DAV (digital audio video) cards that fit within the pizza-box configurations of these two CPUs. At most, the bracket will add another ten minutes to the operation.

SOFTWARE ISSUES

System 7.1.2, which you must install before the card, is included. PowerPCs now ship with System 7.5.

You will find some differences in System 7.1.2, starting with the Power Macintosh Card control panel. This will allow you to have the Upgrade Card on or off on startup. One of the advantages of an upgraded PowerPC Mac over a PowerPC computer is that you can go back to the original CPU to operate a non-PowerPC application instead of running it through emulation.

On powering up your newly reborn PowerPC, you're greeted with the new sonorous startup sound. The splash screen says "Welcome to Power Macintosh," and when you open About This Macintosh, it has rechristened your computer as a Power Macintosh. System 7.1.2 is now the resident OS.

The memory control panel window will look different. Instead of the 32-bit addressing selection, you will find the Modern Memory Manager, which must be turned on to use Power Macintosh programs. 7.1.2 also inherits the Sound Control Panel of the AV Macs. You can select sound input and output sources from the CPU and other external devices.

The emulator program, which is part of the OS in the ROM, translates 680X0 instructions into PowerPC instructions. Some applications are written in hybrid, or mixed mode, so the Mixed Mode Manager, built into the ROM, will traffic-cop the calls between the emulator and other parts of the system for 680X0 code and native code.

How much of a hit does emulation exact? It can be as much as the difference between Quadra 700 and Quadra 950 speed. For modes and applications that are purely native, like QuickTime, the PowerMac will run faster. For instance, when you're working in Adobe Premiere 3.0, which is not native (4.0 is native), the QuickTime playback parts will be faster than before, while storyboarding and testing effects parts can be slightly slower under emulation than in 680X0 environments. There are many applications

that are not performance-bound, like word processors, that you couldn't tell the difference between 680X0 and native.

BUG REPORT

There is one bug in the System 7.1.2 that accompanies the card. It may manifest itself when you start up, freezing and displaying a dialog box that says "Error -41," or it can crash as it is finalizing the redrawing of the Desktop.

It is possible to start up in Card On mode if you press the shift key, thus turning off the extensions, but you cannot expect to do very much in multimedia without extensions, such as QuickTime.

The problem occurs because when System 7.1.2 is installed over System 7 Pro, it overwrites the system folder. This can result in startup problems with the Upgrade Card On to reach PowerPC operations.

The best way to recover from this obstruction is to reinstall a system over the new resident system 7.1.2. Install "Capone"—System 7.5 —or reinstall System 7 Pro back over the 7.1.2. Then, when the card is turned off, you will be operating in 680X0 under 7 Pro, and when the card is on, you will be operating under the 7.1.2 PowerPC native environment. With 7.5 installed, there is no conflict either way, and it takes care of the 680X0 environment in the Card Off mode. 7.5 is running everything whether the card is on or off.

THE LOGIC BOARD, IN ADDITION TO GIVING SOMEWHAT BETTER PERFORMANCE, PROVIDES THE DIFFERENT PORTS AND DELIVERS THE FUNCTIONAL EQUIVALENT OF A FULL POWER MACINTOSH.

With the Logic Board upgrades as with a PowerPC machine, there are no longer any Card On or Off modes, nor a 680X0 environment. 680X0 applications are run through the PowerPC's emulation mode, which almost always suffers a slight performance hit. Thus, the Upgrade Card Power Macintosh retains the "clean" 680X0 environment as an option. For the user who depends upon and regularly uses a library of nonnative 680X0 applications, and may continue to do so for a long time, the upgraded Mac can support the best of both worlds.

POWER BOOKS

Even though it is Intel-based and absentmindedly forgets to mention the existence of PowerPC, *How Microprocessors Work* by Gregg Wyant and Tucker Hammerstrom (208pgsl., $24.95, Ziff-Davis Press) provides a good graphic look at the building blocks of micro architecture and how logic manipulation is selected and directed to fulfill the collaborative tasks of computing. With its clear and concise 3-D diagrams, it helps to reveal the inner mysteries of the microprocessor universe.

Insider's Guide to PowerPC Computing by Jeffrey L. Young (362pgs., $29.99, Que) brings you behind the scenes of the new PowerPC system architecture for Mac and IBM. The first half covers the general range and specs of PowerPC and RISC architecture and how to understand the advantages and applications, and the relationships between architecture, processors, and systems. The second half is a technical overview of the PowerPC architecture and the first two PowerPC processors, the 601—as implemented in the Power Macintosh Upgrade Card—and the 603—designed for low-power applications such as notebooks. Software programmers can learn about the programming model, instruction set, exception model and memory management.

I am not a programmer, but Tom Thompson's book *Power Macintosh Programming Starter Kit* (425pgs., CD-ROM, $39.95, Hayden Books) looks like a good cornerstone for applications development and utility hacking. Its CD-ROM carries a special limited edition of Metrowerks' RISC-based CodeWarrior development environment for the Power Mac, sample code, and many utilities. CodeWarrior claims a compilation speed of 200,000 lines a minute on a Power Mac 8100. This version will run on both PowerPC and 680X0 Macs. You need to have a decent familiarity with C before cranking up CodeWarrior.

Intended for novices as well as experienced Mac programmers, Thompson's book gets you off on the right foot for RISC. He shows how best to use the Toolbox, the PowerPC architecture, debugging, an overview of the PowerPC RISC family, and porting to the Power Mac. The PowerPC world is one in which all Macs, sooner rather than later, will live. ■

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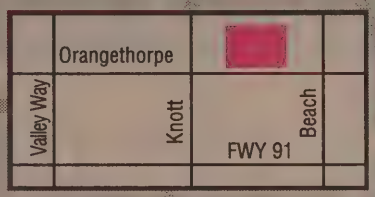

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9600/2400 baud internal fax/modem.....$48/$45
14,400 baud internal fax/modem, v.32bis, v.42bis .....$85/$80

Monitors

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15" Impression 5 multi-freq. monitor, .28dp, 1280x1024 N.I, digital controls, flat screen, green PC ready.....$320/$310
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TEAC 1.44MB 3 1/2" FDD .....$42/$40
TEAC 2.88MB 3 1/2" FDD .....$110/$105

Samsung 1.2MB 5 1/4" FDD .....$46/$44
Samsung 1.44MB 3 1/2" FDD .....$39/$37

420MB, Connor CD-420A IDE HD (14ms).....$215/$205
540MB, Connor IDE hard drive.....$265/$255
250MB, Conner 250 Tape Backup System.....$155/$150

regular/CASH

Western Digital 1 GIG IDE hard drive.....$565/$550

Panasonic *Double Spin* CD-ROM drive (300K/s, 320ms).....$155/$145

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Hewlett Packard DeskJet 520 InkJet printer .....$300/$289
Hewlett Packard DeskJet 560C Color InkJet printer .....$575/$550
Hewlett Packard LaserJet 4+ .....$1425/$1375
Hewlett Packard LaserJet 4P.....$945/$920
Hewlett Packard LaserJet 4L.....$650/$630

Keyboards

Lite-On 4100 101 enhanced keyboard (non-click) .....$22/$19
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KME keymouse 101 keyboard (click, trackball built-in).....$62/$59

Cases

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Mini-tower case (200w ps).....$38/$35
Mini-desktop case (200w ps) .....$65/$62
Mid-tower case (230w ps).....$60/$55
Full-tower case (250w ps) .....$80/$75

Mouse/Trackball

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TrueDox Trackball (50-800 dpi, 3 buttons).....$33/$29
Microsoft serial mouse .....$40/$35

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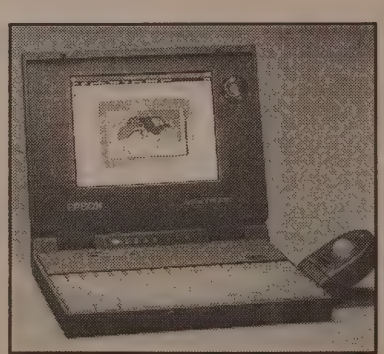

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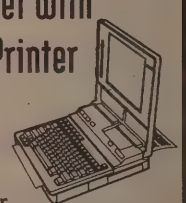

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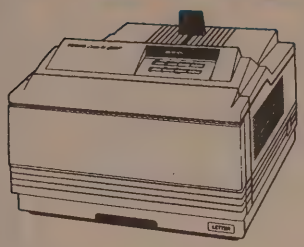

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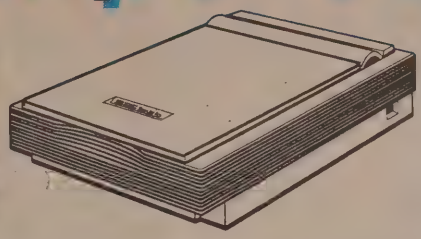

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HP LaserJet 4V/4MV	$Call/Call
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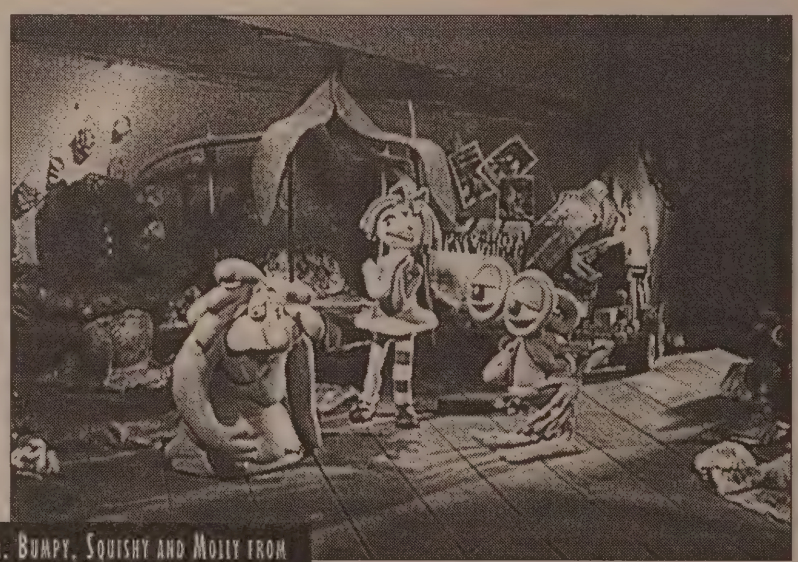
Bump In The Night

Danger Productions Blends Traditional Stop-Motion Animation Techniques With Computer Technology To Create This New TV Show For Kids.

Hiding behind a conservative business park suite in Brisbane lies a 35,000-square-foot labyrinth of movie sets bustling with imagination and activity. Add to this a prop shop along with editing and sound studios and you will find yourself at Danger Productions. *Bump in the Night*, the show currently being crafted here, is the newest entry in the field of animation art known as stop-motion. To create this new TV show for kids, Danger Productions blends traditional stop-motion animation techniques with computer technology.

There are eighteen animators and approximately eighty employees working full-time to create the *Bump in the Night* series for the ABC Fall Saturday morning lineup. The show is based on the adventures and misadventures of Mr. Bumpy and Squishy, who are foot-high characters that inhabit a family's home. In one episode, "Made in Japan," a disappointingly small prize arrives in the mail. The "Turbo-Totronoid" is really a transforming robot who grows big and intimidating when frightened, sad, or homesick. But only Squishy can see the robot looming large; the other characters see just the dinky toy. The tale follows the boy-who-cried-wolf tact until finally they decide, much to the little doll's happiness, to send her back to her home in Osaka. In another episode, "Adventures in Microbia," the characters go through a microscope, become small, and have adventures with the germs.



THE CHARACTERS MR. BUMPY, SQUISHY AND MOLLY FROM BUMP IN THE NIGHT. *Courtesy Danger Productions*

WHAT IS STOP-MOTION?

Stop-motion is the art of photographing a puppet or other inanimate object one frame at a time—moving that object a tiny bit for each successive frame. When the film is assembled and played back the character appears to move seamlessly, as if alive. The term for this type of animation is quite often improperly mixed: LIVE-ACTION go together but STOP-ACTION do not. The correct phrase is STOP-MOTION.

Stop-motion animation techniques have been around almost as long as the motion picture camera. George Pal introduced Americans to this puppetry art form in the 1930s with features such as *Tubby the Tuba*. Ray Harryhausen used it in *Jason and the Argonauts* in 1963. More recently, in 1990, animator Nick Park of England's

BY PAMELA MASON

Aardman Animations won an Academy Award for *Creature Comforts*. The success experienced by Park and others, such as Will Vinton, creator of the California Raisins, and Tim Burton, creator of *The Nightmare Before Christmas*, has helped spur a revival in stop-motion.

USING COMPUTERS IN THE PRODUCTION PROCESS

The traditional techniques for making stop-motion animation are still used predominately but computers facilitate and enhance the process at almost every step of the way. Early in the production process at Danger Productions, Microsoft Word is used for writing the script. The storyboard artist then conceptualizes the whole piece from the script and breaks it into storyboard scenes, which become a visual script. These are grouped into separate packets which are placed on a wall in a bamboo-roofed room called the "tiki hut." The animators work from these packets of drawn instructions for creating their assigned "scenes."

A Macintosh computer and monitor are connected to the video camcorder on the set where filming is taking place. Alex Hansen, the technical director, created custom frame-grabber software in C programming language for the RasterOp video capture card. With the touch of a computer key, one frame, or live shot, is grabbed. This shot can be viewed with the three previous shots, which are held in a buffer. This allows the animator to check for movement continuity before recording the shot to the final output, a 35mm film camera. They know exactly what has been filmed, which saves costly reshooting expenses. The storyboard is also filmed with the frame-grabber and turned into an animatic, a running storyboard with the soundtrack attached on videotape. This is used to guide the overall production and timing of the piece to see how sets and characters are working together visually. As scenes are shot on film and completed, the storyboard version is gradually replaced by the actual stop-motion footage until all of the scenes are completed.

MOTION CONTROL

The Kuper System, from Kuper Controls, is motion-control software that drives special motors, called stepper motors, that control camera movement. It is programmed to make camera moves such as pans, trucks, and zooms and to follow focus automatically. In other words, the camera operator can define a camera move via the software without a person having to manually move the camera frame-by-frame. For example, the camera operator wants to film a particular shot from point A to point B, and to make that shot in a certain amount of time, such as three seconds. By means of a jog-box, or remote control, the camera can be programmed to do this. "One application for motion-control is that it enables us to match moves from live-action full-size sets and then replicate them on a miniature studio set," said camera operator Mike Beanstock.

> **"This is the biggest stop-motion animation production ever attempted for a Saturday morning TV show."**
>
> —Alex Hansen, Technical Director, Danger Productions

SOUND

The voices are recorded in a Los Angeles studio. The dialogue is broken down phonetically by people called "track readers." The characters are animated to match the soundtrack. Other sound effects, like screeches or ringing phones or whatever, can be added to the animation as needed. "With all the sound effects available on both DAT (digital audio tape) and CD," said sound engineer James Allen, "you can go through libraries, pull effects, and place them into a workstation. With SMPTE time code the computer can be used to track the sound effect and match it with video." For video editing they use an Avid, a Mac-based digital editing system. Using SMPTE time code, which is a way of tracking each frame of film by the time-stamp attached to it, the audio and images can then be edited and combined to create the master.

PROP AND PUPPET CONSTRUCTION

The prop shop, where all the puppets and props are designed and built, is filled with props and various objects. Elise Robertson, character department supervisor says, "The fabrication area is a lot like a giant toy box. Many props are built from scratch and every day we face a unique set of design problems. I have to ask, 'How can we build this object so that it can be animated?'"

Many props are built from everyday objects. For example, the pages of a book can be animated by stringing wire inside the book. Or a portable TV will be gutted, painted day-glo pink and redesigned with swirly, stylistic dials. Other things, like chocolate chip cookies, are made from clay and painted. Many of the puppets are first sculpted the traditional way in clay, then cast in plaster molds. Some puppets are soft and made of foam latex from an injection mold. For *Bump in the Night*, Mr. Bumpy has an internal wire armature while Molly has an internal ball and socket type armature. Molly's facial expressions are changed by using a sticker chart of replacement mouths. Some of the puppets have different eyelids for animating each eye position as open, closed, or in between.

"This is the biggest stop-motion animation production ever attempted for a Saturday morning TV show," says Alex Hansen. With a multi million-dollar budget, Danger Productions has been working exclusively for over a year on this twenty-six-week series. It is produced by Ken Pontac and David Bleiman. Some of their past work includes the creation of videogames such as Harley's Humongous Adventure, Clayfighters 1 and 2, and an ABC primetime pilot, *The Danger Team*.

It must be emphasized that the craft of making the characters move, step by step, has not changed much; and while it is indeed a time-consuming process, yielding about minutes of finished animation a week, it is not at all tedious, as it has often been described. It is rather, like many other art forms, a labor of love. It takes the talent and efforts of many people working together to breath life into a stop-motion production. There is a special magic and reward when the film is played and each hand-crafted movement comes to life.

The series *Bump in the Night* premiered Saturday September 10 on ABC at 9 am PST. The half-hour show's format consists of one 11-minute, one 7-minute short story, and a 3-minute musical segment.■

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Resources:

Danger Productions
470 Valley Dr.
Brisbane, CA 94005
(415)467-1220

Avid Technologies
111 Anza Blvd., Ste. 300
Burlingame, CA. 94010
(415)344-4562

Kuper Controls
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Albuquerque, NM 87111
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RasterOp
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Santa Clara, CA 95051
(408)562-4200

Resources

Calendar Of Events

Conferences, Shows, Special Events

November

November 12 Computer Show And Swap Meet. CSU, Northridge. Advertising Concepts Productions. Call: Frank or Beth Perez, (805)520-1423.

November 12–13 American Computer Mega Show. UCLA. American Mega Shows. Call: (818)961-3782.

November 13 Computer Show And Sale. Antelope Valley Fairgrounds, Lancaster. MarketPro Shows. Call: 1-800-708-7555.

November 14–18 COMDEX Conference. Las Vegas, NV. Smith & Shows. Call: (617)449-6600.

November 19–20 Computer Marketplace. Fairplex, Pomona. National Productions. Call: 1-800-800-5600 or (408)778-5200.

November 26–27 American Computer Mega Show. Cal State Northridge. American Mega Shows. Call: (818)961-3782.

November 26–27 Computer Show And Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: 1-800-708-7555.

November 26–27 Pasadena Computer Expo. Pasadena Convention Center. Efficient Device Systems. Call: (818)583-1988.

November 27 ACP Computer Swap Meet. 1310 E. Edinger, Santa Ana. ACP. Call: (714)558-8813.

November 30–December 2 1994 Western Cable Show. Anaheim. California Cable Television Assoc. Call: (510)428-2225.

December

December 3 Computer Marketplace. Sherman Entertainment Center, Reseda. National Productions. Call: 1-800-800-5600 or (408)778-5200.

December 3 Computer Show And Sale. Ventura Fairgrounds. MarketPro Shows. Call: 1-800-708-7555.

December 4 Computer Marketplace. Sequoia Conference Center, Buena Park. National Productions. Call: 1-800-800-5600 or (408)778-5200.

December 4 Computer Show And Sale. Antelope Valley Fairgrounds, Lancaster. MarketPro Shows. Call: 1-800-708-7555.

December 5–6 The Personal Computer Outlook Conference. San Francisco. Technologic Partners. Call: (212)696-9330.

December 5–7 IT Services '94 Conference And Expo. Santa Clara. Creative Expos and Conferences. Call: (508)429-2303.

December 5–9 Video Expo/Image World West Conference And Expo. San Jose. Knowledge Industry Publications, Inc. Call: 1-800-800-5474.

December 10 Computer Show And Swap Meet. CSU, Northridge. Advertising Concepts Productions. Call: Frank or Beth Perez, (805)520-1423.

December 10–11 Computer Marketplace. Pomona Fairplex. National Productions. Call: 1-800-800-5600 or (408)778-5200.

December 11–15 Video Toaster Conference And Expo '94. Universal City. AVID Publications. Call: 1-800-322-2843.

December 12–13 Rational Drug Design: Structure-Based Design And Development Conference. San Diego. International Business Communications. Call: (508)481-6400.

December 12–14 DECUS Conference. Anaheim. Smith & Shows. Call: 1-800-842-7220.

December 14–16 Combinatorial Libraries For Chemical And Biomolecular Diversity Conference. San Diego. International Business Communications. Call: (508)481-6400.

NOVEMBER 26–27

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NOVEMBER 19–20

COMPUTER MARKETPLACE

FAIRPLEX, POMONA

National Productions presents the Computer Marketplace. Hundreds of exhibitors with thousands of products of interest to beginners and advanced computer users will be featured. Admission is $7, parking is $4, and the show is from 10 am to 5 pm. The Computer Marketplace takes place at the Fairplex in Pomona. Call: 1-800-800-5600.

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November 6 Sunday	**BUENA PARK** - Sequoia Conference Center Take the Beach Blvd. Exit off the 91 Freeway, go one block North to 7530 Orangethorpe.	Admission: $5.00
November 19 & 20 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds) Exit Highway 10 at Fairplex Drive. Go North to McKinley, turn right. Turn Left on White Avenue to Gate 14.	Admission: $7.00
December 3 Saturday	**RESEDA** - Sherman Entertainment Center	Admission: $5.00
December 4 Sunday	**BUENA PARK** - Sequoia Conference Center	Admission: $5.00
December 10 & 11 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds)	Admission: $7.00
January 7 & 8 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds)	Admission: $7.00
January 21 & 22 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds)	Admission: $7.00
January 28 Saturday	**SANTA BARBARA** - Earl Warren Showgrounds Highway 101 and Las Positas.	Admission: $5.00

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Dec 17-18 Sat & Sun 10 - 5PM Cal State Northridge
Jan 14-15 Sat & Sun 10 - 5PM Cal State Northridge
South Bay Jan 29 (1-day) Sunday (Only) 10 - 5PM Carson Community Center 801 E. Carson Street, Carson (corner of Avalon & Carson)
Feb 11-12 Sat & Sun 10 - 5PM O.C. Fairgrounds 88 Fair Drive, Costa Mesa (Expo Bldg. # 16)
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Resources

December 17–18 American Computer Mega Show. CSU, Northridge. American Mega Shows. Call: (818)961-3782.

December 17–18 Computer Show And Sale. Del Mar Fairgrounds. MarketPro Shows. Call: 1-800-708-7555.

December 17–18 Computer Show And Sale. Oxnard Community Center. MarketPro Shows. Call: 1-800-708-7555.

January 1995

January 4–7 Macworld Expo. San Francisco. IDG World Expo. Call: Mitch Hall & Assoc., (617)361-2001.

January 7 Computer Show And Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: 1-800-708-7555.

January 9–11 RSA Data Security Conference. Redwood Shores. RSA Data Security, Inc. Call: (415)595-8782.

January 11–12 PDA Industry Forum. San Jose. Apple, Sharp, Casio, Motorola, IBM. Call: Nola Armijo, (415)821-0191.

January 14–15 Computer Show And Sale. Ventura Fairgrounds. MarketPro Shows. Call: 1-800-708-7555.

January 19–22 Medicine Meets Virtual Reality III: Interactive Technology And The New Paradigm For Healthcare Conference. San Diego. UCSD School of Medicine. Call: (619)751-8841.

January 29 ACP Computer Swap Meet. 1310 E. Edinger, Santa Ana. ACP. Call: (714)558-8813.

February

February 15–17 Southwest Regional Government Technology Conference. Austin, TX. GTC. Call: Paul Fairbrother, (512)794-9938.

March

March 7–9 Documation '95 Conference And Expo. Long Beach. Graphic Communications Association. Call: Marion Elledge for conf. info, (703)519-8193; Kathleen Kaiser for expo info, (805)984-4364.

April

April 24–26 DISA's EC/EDI Conference And Exhibit. Seattle. Data Interchange Standards Association. Call: Patricia M. Curran, (703)548-7005.

May

May 19–21 Small Office And Home Office Expo And Conference. Anaheim Convention Center. Advanstar Expositions. Call: 1-800-854-3112.

May 22–25 SunWorld Conference And Expo. San Francisco. IDG World Expo. Call: Susan Granata, 1-800-225-4698.

May 24–26 International Trade Exposition US-China Tech Show. San Jose. CATE Development Inc. Call: (415)903-2270.

Classes, Seminars, Workshops

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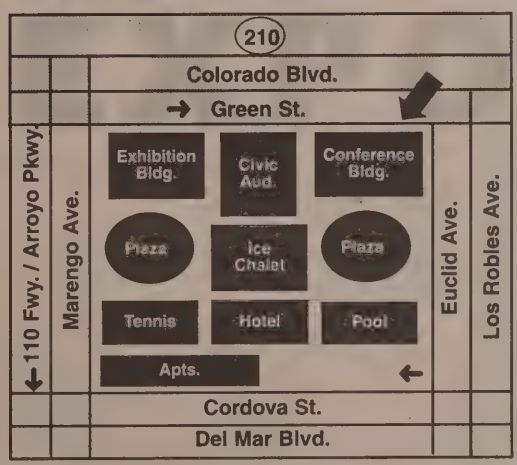

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November 16 How To Be A Better Technical Writer Seminar. Los Angeles. Keye Productivity Center. Call: 1-800-821-3919.

November 19 Doing Business On The Internet Workshop. Los Angeles. Los Angeles Internet Group. Call: (310)358-6957.

November 19 Intro To The Internet Seminar. Los Angeles. Los Angeles Internet Group. Call: (310)358-6957.

November 30 Mastering Multimedia Seminar. Los Angeles. Graphix Zone. Call: Lisa McCormick, (714)453-8080.

December

December 1–2 NetWare Getting Started Seminar. San Diego. Center for Advanced Professional Development. Call: (714)261-0240.

December 3–4 Basic Laser Service Training: LS101 Seminar. Irvine. Diversified Technigraphics, Inc. Call: 1-800-457-5776.

December 4–9 Managing Organizational Change And Development Workshop. Ojai. UCLA Extension. Call: (310)825-4801.

December 5–6 Advanced PC Troubleshooting Seminar. Los Angeles. Essential Seminars. Call: 1-800-723-7025.

December 5–8 Intermediate ScriptX Seminar. Santa Clara. Kaleida Labs. Call: (415)966-0400.

December 6–7 System Administration Of NetWare Seminar. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

December 8–9 Advanced PC Troubleshooting Seminar. Pasadena. Essential Seminars. Call: 1-800-723-7025.

December 8–9 NetWare Troubleshooting, Service, And Support Seminar. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

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December 12–15 Introducing ScriptX Seminar. Santa Clara. Kaleida Labs. Call: (415)966-0400.

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January 17–20 CD-ROM Development Workshop: From Multimedia Publishing To Data Archival. Los Angeles. UCLA Extension. Call: (310)825-1047.

January 18–20 User-Oriented Interface Design: Process And Product Class. Los Angeles. UCLA Extension. Call: (310)825-1047.

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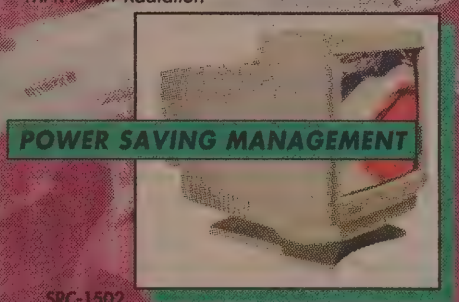

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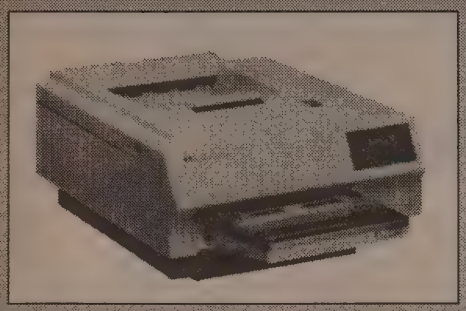

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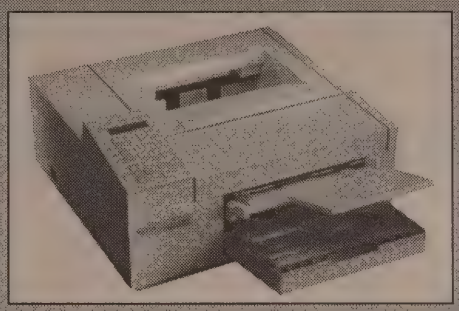

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Asia America BBS. (310)326-1683; (714)772-5301; (818)284-4519, 989-2041. 8-N-1, 2400/9600/14,400. Focus on Pacific Rim economy, cultural and business exchanges. Free. Sysop: Bob F. Howard. [Exp. #130.]

Atlantis, The Lost BBS. (714)256-1360, 828-6459; (818)859-6300, 579-4143, 798-4007. 2400–16,800. RIP, multiline chat, games, forums, and fun. Sysop: Ron DeRuyter. [Exp. #131.]

Aussie BBS. (310)425-5710, 835-4800; (714)670-6500, 537-4300, 572-8800; (818)961-1700. 18 14,400 lines. 35,000+ files, TradeWars 2002, 30 multiuser games, Internet, RIP support. Free trial. Sysop: Mike Szabados. [Exp. #130.]

Close Encounters. (310)947-3997, 902-9538. 24 hrs., 300/1200/2400. Local to many 213, 310, 714, 818, and 909 areas. Multiline social interaction system. [Exp. #130.]

Compu-Net BBS. (213)934-2812; (310)822-0038, 544-4095; (818)782-3623. Internet access. CompuScans, CD-ROMs, dating, adult, windows, IBM, Mac. [Exp. #131.]

Crystal Palace. (310)472-2598, (818)765-2171. 8-N-1, 24 hrs., 300–14,400. 15+GB of GIFs, stories, shareware; Netmail; msg. database; matchmaker; games; computer store. Sysop: Daniel Mathis. [Exp. #131.]

CyberChat BBS. (310)441-1465, (818)784-0007. 2400–14,400. Chat, younger crowd, CD-ROM, gay/bi sections, trivia, games, adult files. Sysop: Spyke. [Exp. #131.]

Korea America Online. (213)962-3634, (714)449-9373. 1200–14,400. 16 lines. Bilingual, Korean programs, information, chat, BBS in Korea list. $10/month, $80/year unlimited access. Sysop: Wayne Jeong. [Exp. #130.]

Miller's Party Board. (213)727-0251, 569-9191; (310)815-0117, 212-3469, 929-4304; (714)739-1060, 537-4436; (805)583-3142; (818)879-1333, 700-0627, 240-8296, 769-2302, 577-5880, 961-2458. 14,400. 32 lines. Chat, live games, 4GB library, pub areas, WorldLink, and more. 14-day free trial. Sysop: Jack Stern. [Exp. #130.]

Mr. Wonderful's Lair. (213)261-8055, (818)451-0874. 24 hrs., up to 28,800. Internet, echomail, games, shareware, adult, 12 CDs. Free 14-day account. Sysop: Mr. Wonderful. [Exp. #131.]

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213

BBS. (213)934-6026. 24 hrs., 1200–9600. Message center, bulletin boards, horse racing data. Type in: FREE (ID) CALLER (password). [Exp. #130.]

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310

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BBS Spotlight

By John Wolcott

Plugging Into A User-Group Supported BBS

Sysop Bob Ottke is anxious to share the BBSing experience with all who would care to endeavor. Ottke commented, "We're here to help. We'll do whatever it takes to get users up and running. If you can't get your modem running, we can help; even if you have to bring your entire computer system to a meeting because you just can't seem to make it work. We will find a way to get you going." With support like this, you can't go wrong.

The Orange Coast IBM-PC Users Group (OCIPUG), based in Huntington Beach, runs a BBS that is primarily for the use of its members. It has been in operation since the spring of 1985 and currently boasts over one thousand members with approximately four hundred of them using the BBS. Having a friendly and helpful club staff is what will make your experience here educational and productive. No, membership is not a requirement for access to the BBS. However, being a member of the group and accessing the BBS proves to be an excellent combination for building your computer skills.

There are four incoming phone lines supported by 286/16 PC-compatible workstations and a 386/33 file server networked with LANtastic v6.0. The workstations support 14.4Kbps modems. The software used to run the BBS is Wildcat! v3.90M, presenting a polished appearance with ANSI graphics.

When first logging on to OCIPUG, you're greeted with system information in the form of a bulletin menu that provides essential information to ensure you obtain the best experience possible from the BBS and the group. No aliases are used here and you won't find all of the fancy features associated with a subscription BBS; just basic "nuts and bolts" computer support. After the initial registration procedure, access to the BBS will be granted upon completion of a "call back verification" feature.

The features offered on the BBS include News Flash, a bulletin menu, message conferences, a file library, Comments To Sysop, and online help. These are fundamental functions that will get you acquainted with using a bulletin board system.

The News Flash contains system help instructions as does the bulletin menu. Just about everything you'd want to know about the BBS is contained here. If you can't find your answers here, you're invited to leave a message to the sysop with your questions.

The message conferences allow users to share experience and commentary for most any topic. This is a great place to pose any computer question not specifically related to the BBS to draw from the knowledge base of the club as a whole. The Message menu is loaded with features including the ability to upload or download messages. This will make efficient use of your allotted time.

The file libraries are well maintained for the latest in shareware and freeware; sporting almost four thousand files. If you're looking for the latest version of a public domain application, it's probably here. Sysops render a watchful eye over what files are available to ensure appropriateness and currency. All popular download protocols are supported. File libraries are organized into meaningful categories to assist you in your search for files.

The OCIPUG provides an excellent mix of group support and online experience, well meeting the needs of the BBS community. Dues for club membership are $36 annually with enhanced privileges for paying members. OCIPUG BBS can be reached by calling (714)843-9248 with the standard modem protocols of 8-N-1. Give them a call to invest in your computer experience. ■

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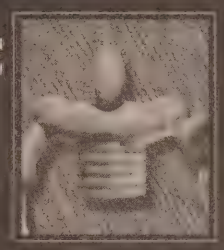

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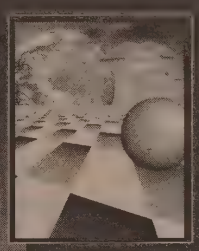

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(310)677-7034. 8-N-1, 24 hrs., up to 14,400. Provides listings of business and franchise opportunities; place your ads; and more. Sysop: Lawrence C. Toliver. [Exp. #129.]

CyberKorea BBS. (310)926-1899. Korean files, Badook-go, forums, Internet email. No fee. [Exp. #131.]

Fantasy FX BBS. (310)595-5169. 8-N-1, 24 hrs., up to 14,400. Fun and games, DOOM support files, Net mail, two CD-ROMs online. Free. [Exp. #129.]

France OnLine™. (310)441-7280. 24 hrs., Eight lines. French-speaking BBS. Chat, forums, news from France, calendar. $5/mo. [Exp. #130.]

Gato's Lair BBS. (310)396-9744. 24 hrs., 8-N-1, 2400–28,800. Net echos, online games, email, adult sections, 10:1 ratio. Free. [Exp. #131.]

Health Online. (310)831-6775. 8-N-1, 24 hrs., 1200–28,800. For healthcare professionals, caregivers, patients, people interested in their own health; files. Free. Sysops: Tom and Susan Dorsey. [Exp. #131.]

Independent Filmmakers Forum. (310)425-0012. 8-N-1, 24 hrs., 2400/9600/14,400. Online networking for independents, forums, chat, job listings, free screening passes, and more. Free trial. Sysop: Philip Matuzic. [Exp. #134.]

Interactive Shopping Network. (310)445-1500. 24 hrs., 1200–14,400. Shop for computer hardware and software, furniture, classifieds with photos. Free except classifieds. [Exp. #130.]

La Mirada's The Modems Delight BBS. (310)944-1221. 24 hrs., 1200–16,800. Multi-interest files, doors, games, fun, Qmail4, echomail, FidoNet, RimeNet. Sysop: Ron Dishon. [Exp. #130.]

Manhattan Online. (310)374-9994. 28,800. Four lines. Windows, DOS, Mac, OS/2, FidoNet, Internet, CD-ROM sales. Free. Sysop: Paul Swanno. [Exp. #131.]

Mommadillo's BBS And Breakfast. (310)438-7830. 24 hrs. v.42bis WWIVNet @1175. Games, files, good conversation for your online enjoyment. [Exp. #131.]

Moroni BBS. (310)392-3981. 24 hrs., 300/1200/2400/9600. Hundreds of Mormon church-related documents plus 650MB of shareware. Free. [Exp. #131.]

New World Order BBS. (310)978-0024. 24 hrs., 300–28,800. Technical, schoolwork help, OJ's trial, online games, helpful sysop. Free. Sysop: Richard Schwartz. [Exp. #129.]

Oasis BBS. (310)462-1239. 8-N-1, 24 hrs., 2400/14,400. Public forums on various topics from Russia to ancient Greek. Free. [Exp. #129.]

One World. (310)372-0987. Ecology, gardening, health, alternative news, international network. Free. [Exp. #129.]

Original Apple Corps BBS. (310)454-4660. Apple II support. Sysop: Ed Molina. [Exp. #131.]

Sable OnLine! (310)768-8372. 1200–14,400. Internet, FidoNet, multiline chat, CD-ROMs online, ASP approved BBS. [Exp. #131.]

Starfleet HQ II BBS. (310)422-8178. 8-N-1, 24 hrs., 300–14,400. Online games, VNET/IceNet/others, Star Trek news/discussions. No fees. Sysop: Rodney Palmer. [Exp. #131.]

Stavromula Beta. (310)322-6963,11,11. 8-N-1, 24 hrs., 14,400. Intelligent conversation, unique online games, AlterNET hub, Project Insomnia Software. Free. [Exp. #129.]

Upper Transylvania BBS. (310)515-6843, 515-6953. 24 hrs., 1200–28,800. Seven PC-oriented CDs online, FishNet Christian Network hub. Free. Sysop: Ron Hoffman. [Exp. #130.]

Why Not BBS. (310)436-1311. 2400–14,400. Five lines. Four CDs, shareware, GIFs, games, chat. Great for beginners. Sysop: David A. Scott. [Exp. # 129.]

Xchange-Net. (310)452-3374. 8-N-1, 300–9600+. All classified ads; a swapmeet of detritus, flotsam, scrap, and anything this side of Jupiter. Free. Sysop: Rex Brains. [Exp. #129.]

714

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The CAT BBS. (714)979-8333. Santa Ana. Sysop: Bob Blakeley. [Exp. #130.]

Check Six BBS. (714)362-8299. 8-N-1, 1200–28,800. Five nodes. Flight simulation msgs. and files, Internet, Usenet, SimNet. Limited free access. Sysop: Patrick Gost. [Exp. #129.]

Cloud Lake BBS. (714)768-3585, 830-9384. 8-N-1, 24 hrs., 2400–28,800. 50,000+ files. Science, astronomy, engineering, programming, Windows, DOS, games, and more. Sysop: Ed Barnes. [Exp. #131.]

Construction Online. (714)378-4779. 8-N-1, 2400–14,400. Building products, email, forums, building permits; after 6 pm chat, games. Sysop: Kathy Weaver. [Exp. #130.]

CWI-BBS. (714)870-1033. 8-N-1, 24 hrs., 2400–14,400. Entire CWI disk catalog plus six CD-ROMs. Free browse, friendly chat. [Exp. #130.]

Dizzyland. (714)637-7657. 24 hrs., 2400–19,200. Many networks, APOGEE shareware direct file section, online games. No fee. [Exp. #130.]

Eat My Shorts! BBS. (714)827-7776. 8-N-1, 24 hrs., 28,800. 1.2GB adult, online games, and netmail. [Exp. #131.]

The Emerald Isle BBS. (714)870-3050, 786-2764. 300–14,400. 25 lines. 18 CD-ROMs, chat, multiplayer games, fun and excitement. Free trial. Sysop: James Wihardja. [Exp. #129.]

The Entrepreneur Connection. (714)280-9556. 8-N-1, 14,400. Learn to start a business or search for businesses and franchises to buy. Free demo. Sysop: T.R. Sills. [Exp. #129.]

Global BBS. (714)373-1544. 24 hrs., 300–14,400. Political forums and organizations, worldwide VirtualNET, backpacking forums. No fees. Sysops: Chris and Jarome. [Exp. #130.]

Good Sam BBS. (714)957-2881. Business accounting software users group; MAS90, and others; software developers, systems analysts, more. Sysop: Michael De Tomaso; voice, (714)751-2349. [Exp. #129.]

The Great Escape! (714)631-5112, 894-4329. 10 lines. Nationwide chat, multiuser games, War-of-Worlds, Internet email, more. Free trial. [Exp. #131.]

Happy Trails BBS. (714)547-0719. 24 hrs., 28,800. Seven lines. FidoNet, Internet, UChat, QSO, 2GB downloads. Free trial. Sysop: Don Inglehart. [Exp. #131.]

Imagine-NET. (714)660-7738. 8-N-1, 24 hrs., 14,400. Two lines. First Class Mac/Windows BBS, OneNet, four user groups, shareware. Free. Sysop: Douglas Nottage. [Exp. #130.]

Infinity BBS. (714)898-3236. 8-N-1, 24 hrs., 300–14,400. Internet, Usenet, satellite fed shareware, games, teleconference, call today! Sysop: Dan Minear (suitcase). [Exp. #129.]

InfoMat BBS. (714)492-8727. 24 hrs., 2400–14,400. Largest selection of online magazines around; P&BNet, Intelec, RIME, RaceNet, ROCIEnet, and JOBNet email. [Exp. #129.]

Junior Flight Deck BBS. (714)549-0472. Santa Ana. Sysop: Ted Stein. [Exp. #130.]

L.A. Classifieds. (714)548-2110. 14,400. Free private party classifieds, matchmaker, chat, photos. Free access. Sysop: Jerry Macoy. [Exp. #131.]

MacShak BBS. (714)373-0656. 24 hrs., 2400. Newly expanded Mac, amateur radio, consumer, and adult interests. Sysop: Dude B Narley. [Exp. #129.]

The Modem Express. (714)994-9502. 14,400. Files, games, doors, chat, multiuser interest. [Exp. #130.]

Nature Reserve BBS. (714)828-7296. Cypress. [Exp. #130.]

On The Fly BBS. (714)554-2518. 23 hrs., 2400–14,400. Echomail specialists. FidoNet, Infinet, Racenet, Soundtrax, ITCnet, Internet email. Free. Sysop: Blade Runner. [Exp. #130.]

OrnJuce. (714)778-1228. 8-N-1, 24 hrs., 300–14,400. BBS of the All Computer Assoc. of Orange Co. Supports Atari, Mac, PC, and others. Free. [Exp. #131.]

Purple Dragon BBS. (714)531-6664. Anaheim. [Exp. #130.]

Real Estate Online. (714)969-9624. 8-N-1, 24 hrs., 300–14,400. 14 lines. ANSI and RIP, free realty info, over 200 MajorNet forums, email, chat, games. Sysop: Doug Campbell. [Exp. #129.]

Stitchers Source BBS. (714)589-1718. 8-N-1, 14,400. Needlework, crafting, sewing, etc. FidoNet. [Exp. #131.]

TwiLight Hills BBS. (714)898-8004. 8-N-1, 24 hrs., 14,400. Multiline adult, chat, matchmaker, games, files. Free trial, low rates. Sysop: Lady Vixen, Lord Stryder. [Exp. #129.]

The Viewlink BBS. (714)650-4612. 14,400. Four lines. Latest shareware games, hottest adult GIFs, six CD-ROMs. 28¢/hour. Sysop: Terry Andrews. [Exp. #130.]

Vivid Image BBS. (714)669-8823. 8-N-1, 24 hrs., up to 14,400. Shareware, UFO, needlework, crochet, games, files, doors, CD-ROMs, classified, matchmaking. Free access. Sysop: Veno Dos Santos. [Exp. #129.]

Weaveworld BBS. (714)378-4779. 24 hrs., 14,400. TradeWars 2002, games, Internet, chatlink, forums, email. Free trial, $10/mo. Sysop: Jerry. [Exp. #131.]

818

Blazin' Bytes BBS. (818)776-2777. 16 lines. Games, pubs/SIGs, chat, warm family-style adult board, women welcome. Sysop: Barbara Mallut. [Exp. #131.]

Caheunga Pass BBS. (818)796-6096, 796-8429. 2400–28,800. Macintosh/IBM welcome, 1GB of shareware, friendly users, great discussions, online games. Internet contact: boingo@netcom.com . [Exp. #131.]

Compu-Ad Information Network. (818)858-2763. 24 hrs., 2400–19,200. Multiline, 6000+ files, online photo real estate, missing children files, etc. Free. Sysop: Richard Belleville. [Exp. #129.]

The Continuum BBS. (818)441-2625. Files, doors, chat, echomail, Internet email. Free access for two weeks. [Exp. #130.]

CPI BBS. (818)967-5699. 8-N-1, Libraries, games, matchmaking, more... Authorized eSoft dealer. Custom BBS, Internet marketing. Free access. [Exp. #130.]

Cracker Barrel BBS. (818)506-4617. North Hollywood. [Exp. #130.]

David's Amazing BBS & Internet Services. (818)997-7500. 300–38,400. Dare to be different with a creative, original system. Free until I get all the bugs out, then $7.50/mo. Sysop: David H.

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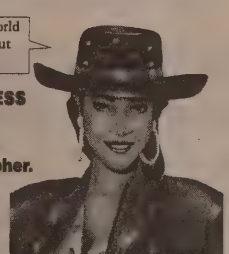

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BULLETIN BOARDS cont.

Dennis. [Exp. #129.]

DZBO's Monitor 1. (818)989-3286. 24 hrs., 2400. Astronomy, art, graphics, tools, games, teens, adults, classifieds, more. Free. Sysop: K. D. Dizibio. [Exp. #129.]

Follow Your Heart—Heart Disease Support BBS. (818)776-2778. 24 hrs., For heart disease patients, family, friends, caregivers, plus medical community; caring. Free. [Exp. #131.]

The Galaxy-II BBS. (818)706-0130. Up to 28,800. Four lines. Supports PBM game of Galaxy-II. Corridor 7, Doom, 45 friendly door games, more. Free. Sysop: Brett Tondreau. [Exp. #129.]

Gifshoppe BBS. (818)989-0975. 24 hrs., 2400–14,400. Eight lines. Games, matchmaker, 8GB adult GIFs, ThrobNet, HotNet, WildNet, FidoNet. Sysop: Dan Bauer. [Exp. #131.]

International TradeLine. (818)843-4102. 24 hrs., 2400–14,400. International trade, NTDB/FTI access, market research, computer software, business contacts. [Exp. #130.]

InvestorLink. (818)331-4611. 8-N-1, 24 hrs., 9600. Business and finance, investment, Cal. real estate, daily commodity prices, real-time news. Sysop: Steve Painter. [Exp. #131.]

The Labyrinth BBS. (818)794-0490. 8-N-1, 24 hrs., 14,400. Files, messaging, FREE Internet, user uploads, doors, QWK mail. Free. [Exp. #131.]

The Labyrinth Shareware Registration System. (818)792-2523. 8-N-1, 24 hrs., 2400–14,400. Shareware for free! Register online. Tech support by authors. Sysop: Chris Schurer. [Exp. #131.]

LA Free-Net. (818)776-5000. 8-N-1, 24 hrs., up to 14,400. 16 lines. Nonprofit community network with extensive Internet connections: newsgroups, gopher, email; and more. $10/year. Sysop: Alex Jalinous. [Exp. #130.]

Movers & Shakers—Parkinson's Center BBS. (818)776-2784. 24 hrs. For Parkinson's Disease patients, caregivers, families, friends, and medical community. Warm and personal. Free. [Exp. #131.]

On The Bright Side—Agoraphobia Support Board. (818)776-2781. 24 hrs., For those with agoraphobia/panic disorders, family, friends, caregivers, medical community; caring. [Exp. #131.]

P-Funk Online. (818)914-0498. 8-N-1, 24 hrs., 2400. Internet, Usenet, GIFs, games, N Azusa 4 da'funk. Still free. Sysop: jeffery@pfunkonline.com . [Exp. #129.]

Pro-Line. (818)730-9896. 46 lines. Chat, matchmaking, lifestyles, email, files, games, fun, and more. Free trial. [Exp. #129.]

Reflex Connect. (818)563-9345. 24 hrs., 14,400. Windows for Workgroups 3.11 remote access login, ID:Guest, pswd:password, Domain:RAS-TA. leave msg. in \users\regist\guest. Free. [Exp. #129.]

Southland BBS. (818)793-9108. 14,400. Internet email, Usenet newsgroups, Linux, MUD, and chat. Sysop: Joseph Gomez. [Exp. #130.]

Sugar Free BBS! Diabetes Support Board. (818)776-2779. 24 hrs., For those with diabetes, family, friends, caregivers, medical community; caring. Free. [Exp. #131.]

The Big "C" BBS—Cancer Support BBS. (818)776-2780. 24 hrs., For cancer patients, family, friends, caregivers, medical community; warm and caring. Free. [Exp. #131.]

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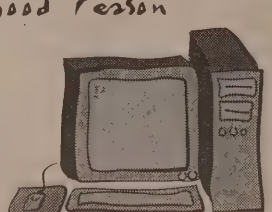
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USER GROUPS

ACCESS

Access Developers Group. Meetings: 3rd Tues., 6:15 pm, Microsoft Orange County Office, 3 Park Plaza, Ste. 1800, Irvine (Jamboree at Main, next to Hyatt Regency). Meetings include formal presentations, tips and tricks, and Q&A sessions. Call: Michie Kobayashi, (714)770-0400, ex. 2217. [Exp. #134.]

AMIGA

Amiga Users Group Of Long Beach. Meetings: 1st Thurs., 7:00 pm, Fire Station Bldg., 5373 E. Second St., Belmont Shores. All persons with an interest in the Amiga computer welcome. Free. [Exp. #131.]

ATUG—San Gabriel Valley. Meetings: last Tues., 7:00 pm, Michelangelo's Pizza, San Dimas; 3rd Sat., 11:00 am, 1st Southern Baptist Church, Temple City. Call: Steve Ward, (818)285-6424. [Exp. #132.]

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wednesday, 7:30 pm. Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Super SIGs, PD disks. Call: Gene Edwards, (213)384-8711. LAAUGLine BBS: (213)387-1002. [Exp. #129.]

SFVAUG—San Fernando Valley Amiga User Group. Meetings: 2nd Tues., 7:00 pm, "The Meeting Place" off the Food Court in Fallbrook Mall. Continuing the exploration of the Amiga in the area's most active Amiga Orphan support group. Call: Ernie, (805)526-8252. [Exp. #130.]

APPLE

Champions Of The Mac Proletariat (CHOMP). Meetings: monthly, 7:00 pm, Cal Poly Pomona. Question and answer, raffle of useful software, opportunity to purchase disks. Call: Craig Richards, (909)985-7385 or Mitch Cohen; (909)598-5766. [Exp. #134.]

Original Apple Corps. Meetings: 2nd Sun., West LA area. Apple II and Mac users group. Support for beginners through experts. Call: Fred Duffy, (310)450-3336. [Exp. #134.]

ATARI

All Computer Association Of Orange County. Meetings: 2nd Sun., 1:00 pm, Fullerton Savings, 12860 Euclid Ave., Garden Grove. Supporting Atari, Macintosh, PC, and other computer systems. Call: (714)265-9357. [Exp. #134.]

ATESIG—Atari 8-Bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative user group for model railroad applications. Call: (310)430-5433. [Exp. #134.]

COMMODORE

Commodore Helpers of Long Beach. Meetings: 2nd Sat., 9:00 am., Community Presbyterian Church, 6380 Orange Ave., Long Beach. Call: Bill Davies, (310)599-1913. [Exp. #133.]

Commodore Technical Users Group (C=TUG). Meetings: 4th Sunday, 1:00 pm, Senior Citizen Center, 170 S. Olive Rd., Orange. Public domain library, documents library, and magazine. Software and hardware help. Call: Lou Palush, (714)532-1802. [Exp. #133.]

Orange County Commodore Club. Meetings: 4th Sat., 11:00 am, Costa Mesa Public Library, 1855 Park Ave., Costa Mesa. Call: Mike Moore, (714)668-9715. [Exp. #133.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm, SCE Generating Station, 1100 Harbor Dr. (across from King Yacht Harbor), conference room, Redondo Beach. Support for 64/128 computers; receive or exchange information on programs, applications, or hardware. Call: Dave, (310)324-8357. [Exp. #130.]

Southern California Commodore Users Group. Meetings: 3rd Tue., 7:00 pm, Nazarene Christian School, Rm. 18, 15000 Studebaker Ave., Norwalk. Call: Bill Davies, (310)599-1913. [Exp. #133.]

CORELDRAW

CorelDRAW User Group (independent). Meetings: 2nd Mon., 7:30 pm, Jolly Roger Hotel, 2904 Washington Blvd., Marina Del Rey. Speakers on design and printing, CorelDRAW tutorials, and favorite shareware. Call: Michael, (310)545-1478. [Exp. #130.]

EPSON

Epson UG/Orange County. QX, PX, CP/M, VALDOCS—support, tech, periodical & disk library, parts. Call: (714)893-3305 or (310)430-4731. [Exp. #130.]

FINALE

Finale User Group (FUGUE). Meetings: 4th Wed., 7:30 pm, Electronic Music Box, 14947 Ventura Blvd., Sherman Oaks. Tips and problem solving. Bring files on disk. SIG of LAMG. Call: Bonnie Janofsky, (213)658-5997. [Exp. #131.]

IBM & COMPATIBLES

All Computer Association Of Orange County. Meetings: 2nd Sun., 1:00 pm, Fullerton Savings, 12860 Euclid Ave., Garden Grove. Supporting Atari, Macintosh, PC, and other computer systems. Call: (714)265-9357. [Exp. #134.]

Cedar Village Users Group. Meetings: 2nd Sun. (3rd if 2nd is holiday), 3:00 pm, Speakers, software, BBS, and more. Contact: Tony Barnes, P.O. Box 1141, Bloomington, CA 92316, or modem (909)356-1269. [Exp. #131.]

Fresno PC Users Group. Meetings: 1st Mon., 7:30 pm, Ramada Inn, Conference Room A, 324 E. Shaw Ave., Fresno. Call: (209)496-3974. [Exp. #134.]

Greater South Bay PC User Group. Meetings: 2nd Thurs., 7:30 pm, Torrance Recreation Center located behind the main city library, Torrance. Visitors welcome. Email: (310)335-2799. [Exp. #131.]

Long Beach IBM PC And Compatibles Users Group. Meetings: 3rd Wed., 7:00 pm, Masonic Temple, 5155 E. Pacific Coast Hwy., Long Beach. Novice and experienced welcome, BBS, public domain library, newsletter, SIGs. $25/year, $35 for families. Call: Jim Wells, (310)439-7114. [Exp. #132.]

Los Angeles Computer Society. Meetings: 2nd Tues., 7:00 pm, Culver City High School, 4401 Elenda St., Culver City. Presentations from prominent software and hardware developers and Q&A sessions. Call: (310)471-2726. [Exp. #132.]

NOCCC (North Orange County Computer Club). Meetings: 1st Sun. Computer-oriented meetings, SIGs, newsletter, raffles, and BBS. Call: (714)998-8080. [Exp. #131.]

Orange County IBM PC Users Group. Meetings: 2nd Tues., 6:30 pm. Speakers, software, newsletter, BBS. Open to public, all welcome. Call: (714)990-0580. [Exp. #130.]

Pasadena IBM Users Group. Meetings: 3rd Wed., 7:00 pm, 2184 N. Lake Ave., Altadena. Speakers on hardware/software, SIGs, library, newsletter, and BBS. Call: Steve Bass, (818)791-1300. [Exp. #132.]

Software Users Group Of O.C. Meetings: monthly in Irvine. Serves IBM compatible users who are new to computers. Call: (714)721-8751 (modem). [Exp. #129.]

Southern California Computer Society. Meetings: 4th Tues., 7:00 pm, Farmers & Merchants Bank, 12535 Seal Beach Blvd., Rossmoor. We welcome all who are interested in computers; BBS and newsletter. $15/yr. Call: Hank Burwash, (310)596-9670. [Exp. #132.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 3rd Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)494-8675. [Exp. #134.]

TUG-NET. Meetings: First four Thurs., 7:00 pm, Glendale Federal Bank, 7119 Topanga Cyn. Blvd., Canoga Park. Ample parking, visitors free. Call: (818)249-1629 or 884-9441. [Exp. #132.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Burbank Board of Realtors Bldg., 2006 W. Magnolia, Burbank. BBS, PD library, SIGs, newsletter. All welcome. Fee, $4. Call: Estella McClintock, (818)848-1948 or Grayce Hruda, (818)842-3707. [Exp. #131.]

Valley IBM Compatible Users Group (VICUG). Meetings: 3rd Fri., 7:00 pm, State Bldg., 6150 Van Nuys Blvd., Van Nuys. Call: Harry Tischler, (818)997-1470. [Exp. #131.]

KAYPRO

KAYOS Kaypro User Group. Meetings: 4th Mon. of even months, 6:00 pm, El Segundo Library, Mariposa and Richmond streets. Call: (310)379-8339. [Exp. #131.]

MACINTOSH

All Computer Association Of Orange County. Meetings: 2nd Sun., 1:00 pm, Fullerton Savings, 12860 Euclid Ave., Garden Grove. Supporting Atari, Macintosh, PC, and other computer systems. Call: (714)265-9357. [Exp. #134.]

Champions Of The Mac Proletariat (CHOMP). Meetings: monthly, 7:00 pm, Cal Poly Pomona, grey building near administration building, rm. P2-7. Call: Craig Richards (909)985-7385 or Mitch Cohen, (909)598-5766. [Exp. #134.]

Original Apple Corps. Meetings: West LA area. Apple II and Mac user group. Support for beginners through experts. Call: Fred Duffy, (310)450-3336. [Exp. #134.]

South Bay Apple Mac User Group. Meetings: Last Wed., 8:00 pm, El Camino College, MCSC Rm. 100, 16007 Crenshaw Blvd., Torrance. Newsletter, PD library, demos, and raffles. Call: (310)644-3315. [Exp. #131.]

Southern California Macintosh Owners/Users Group (SMOG). Meetings: usually 2nd Sat., 10:00 am, Western Digital Bldg., off 405 Freeway at Irvine Center Dr., Irvine. Speakers, product demos, Q&A, PD disks. All skill levels. Call: Dani Maloy, (909)698-7737. [Exp. #132.]

West Orange County Macintosh User Group (WOCMUG). Meetings: last Tues., 7:00 pm, Emerson Elementary School, 2625 Josie, Long Beach (NE corner of Palo Verde and Willow, just north of 405 fwy at Palo Verde). Come and join with other Mac Users to share knowledge and experiences. Call: Lynn Goodrich (714)892-8910 or Tony Muller (310)493-1240. [Exp. #134.]

POWERBUILDER

Los Angeles PowerBuilder User Group. Meetings: 1st Tues., 6:00 pm, Sony Entertainment, 3400 Riverside Dr., Burbank. [Exp. #131.]

PROGRAMMING LANGUAGES

The Software Toolsmiths. Meetings: Last Sat., 10:00 am, Joslyn Center, 339 Sheldon St., El Segundo (except Nov. and Dec.). Discussions and tutorials on programming: C++, Forth, J, Smalltalk, algorithms, etc. Neophytes welcome. Call: John LuValle, (818)797-1820, or Howard Rogers, (310)532-3342. [Exp. #131.]

UNIX

UUASC, The UNIX User's Association Of Southern California. Meetings: 2nd Mon., 7:00 pm, New Horizons Computer Learning Center, 1231 E. Dyer Rd., Santa Ana. Geared to professional and amateur users of all flavors of UNIX, including Linux. Call: Larry, (714)526-4347. [Exp. #130.]

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Realizable Fantasies continued from page 32

they appear to be planning to pay the phone companies to implement most of the system—and the US phone system is one of the best in the world.

There is one other somewhat perverse hope: Perhaps some of the nation's more adept phone phreaques and computer crackers will be the first to penetrate this national surveillance system—even *before* it's done by some well-funded foreign spies, pursuing industrial or political espionage. (Do you know of *any* public phone system in the US that has not been cracked?)

And perhaps the crackers will follow their tradition of broadcasting their access methods all over the nets. Then *everyone* would have equal surveillance tools; not just incumbent officials. Maybe *that* would awaken our nearsighted government zealots to what they have done.

Predictable Futures

Please note that switching current analog systems to ISDN or other digital systems in the future would certainly classify as "significant upgrading." Thus, it appears that the bill forces phone companies to include wiretap access in all current systems that they have not yet converted to digital.

And if the carrier also supplies the desksets for the customer sites, then they will have to upgrade customers' desksets and/or handsets. Is it too much of a stretch for the attorney general to declare that implementing *their* wiretap system requires desksets that can be remotely turned on—even when they are on-hook? Of course, this would only be used whenever authorized by law—or activated by any staffer with access.

And video-phones are predictably in our interactive communications future. They require a camera in the user's deskset—in the bathroom, bedroom, or boardroom. It's clearly a significant upgrade.

As cable carriers move in to compete with the phone companies, they will obviously fall under the control of this legislation. What are you watching, and when are you watching it?

What agencies will successfully justify their need for access to this surveillance system? The Bush administration's drug forfeiture funds entirely paid for development of the Clinton administration's decoy surveillance system, the Clipper chip—outside of congressional oversight or funding. The DEA is making billions of dollars from seizing money and property that they allege might somehow be related to drug use, transportation, or sale. Using this system and automated voice-recognition, they could find billions more. How about social services agencies going after child-support scofflaws—already used to justify requiring the Social Security number on drivers' licenses?

Once surveillance is so *easy*, how might the radical Right and the Politically Correct possibly use it to monitor "nasty" discussions or incorrect speech?

Of course, all of this is ridiculous paranoia—as unreasonable as it would be to believe that a sitting president would authorize break-ins to an opposing party's headquarters, or that a director of the FBI would monitor Elvis Presley and John Wayne.

Too Much Power For Those In Power

There is no question that law enforcement and other security agencies need the ability to conduct reasonable wiretaps—even if they *did* ignore the wiretap information they received prior to the World Trade Tower bombing. It is equally true that they will need to buy new equipment to be able to tap ISDN and other digital communications—for hundreds of dollars each. And we would all like to see good government do its work efficiently. (A half-billion dollars for a "few hundred" short-term wiretaps.)

But this national citizen surveillance system is *much* too powerful to give to government as a whole, much less vesting its control exclusively in the executive branch. It is too easy to abuse—just as the FBI surveillance power was abused for decades.

It is most especially dangerous without ample oversight. At the *least*, it should include automated monthly reports from the communications carriers to the legislative and judicial branches—just like phone bills, and generated just as automatically—detailing exactly who is doing what, to whom, with which part of this awsome authority.

But then again, executive branch incumbents might not want that kind of automated surveillance of what *they* do. ■

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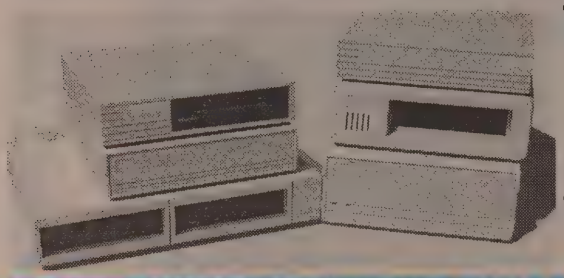

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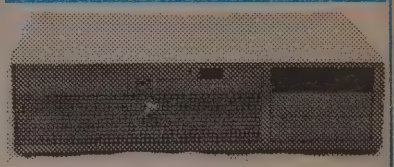

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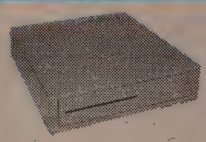

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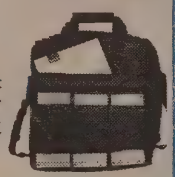

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VCs And The Internet

In recent months, venture capitalists have shown an increasing tendency to do business on the Net themselves, and also to invest in Internet-related companies. We asked a few of them how they used the Net, and also how they viewed it as an emerging business platform.

—ME

Wade Woodson

ww@spvc.com
General Partner
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Sigma is quite interested in the growth and commercialization of the Internet, as indicated by our early investment in PSI, the largest commercial Internet access provider. Our other portfolio companies include STAC Electronics, Cascade Communications, Atria Software, Applied Digital Access, Wellfleet Communications, SuperMac Technology, Phoenix Technologies, Clarify, RayDream, Vivo Software, Endgate Technology, Worldtalk Corporation, and Octel Communications

As an open system, we feel that the Internet's scope will continue to expand, providing the sort of marketplace discontinuity in which fast-moving, innovative new companies can flourish. At the same time, the Internet is an immature medium for commercial purposes, and only those companies who understand its personality can really put it to work.

I use the Internet extensively. For venture capital purposes my use is primarily email communication with my portfolio companies and my business network. After hours, I use it as a resource for programming projects as well as a way to track news and gossip via Usenet.

Sigma is an information technology venture firm. Our largest concentrations of investments have been in communications and software. Despite the fact that our emphasis is on risky, early stage investing, more than half of all Sigma investments have achieved an IPO within four years of our investment and fewer than one in ten has lost money for us.

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First, we are investors in Internet-related companies. UUnet Technologies is an investment, and a number of our other networking and software investments offer Internet-centric products—Santa Cruz Operation and Remedy are two examples.

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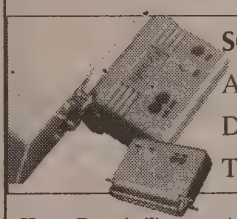

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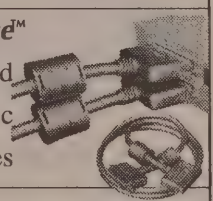

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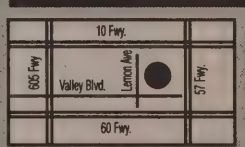

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Good Times For VCs *continued...*

Second, we use the Internet for communications with our portfolio companies. One of the subtle benefits comes when we can be copied on the internal email lists of our companies, so that we are integrated with their own business processes. It allows us to be uniquely responsive and aware, with essentially zero cost for our entrepreneurs.

Third, we use the Internet for due diligence. While not all customer checks can be performed over the Internet, we can at times reach busy people and receive extraordinarily detailed replies to our questions, in a format that is instantly ready for our final investment memorandum! In addition, newsgroups are a great way to judge the relative importance of certain topics and vendors, and are a forum to elicit (relatively) unbiased opinions about vendors, technologies, architectures, and so forth.

Fourth, we use the Internet for prospecting. We have been able to uncover well over one hundred opportunities in the year that we have been on the Net. And since we have a high-speed link, we are able to do more prospecting than most.

We are absolutely interested in receiving solicitations over the Net. Inquiries come to us through the mail, the fax, hand delivered...and over the Net. We would strongly recommend sending only an executive summary, as email is not a great medium for sending large documents. Entrepreneurs will likely find more rapid responses, and more thoughtful responses, to email inquiries. I'm more likely to process my email in-box than my perennially full pile of business plans.

Finally, areas of interest for us continue to center around healthcare, communications, and software.

In networking, we continue to look at ATM-related opportunities (we have seven investments so far), ISDN-related products, networking for the small office/home office market, and products building upon emerging standards in computer/telephony integration.

In multimedia we continue to look at a wide variety of tools, titles, and services for business, consumer, and education markets.

In client server software we are receptive to broad applications (such as financial management), innovative tools, standards-based network and systems management, and email-enabled application opportunities.

Finally, in mobile computing we are bullish on PCS, wide area mobile data, and remote LAN access.

Michael Moritz
moritz@sequoiacap.com
Sequoia Capital

Sequoia's focus is what it has always been: financing promising ideas and companies in the electronics and medical arenas. We are willing to write checks as small as $50,000 and as large as $6,000,000.

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Healthcare: Amylin Pharmaceuticals, SangStat Medical, Chemtrak, CV Therapeutics, Endovascular Technologies, Vidamed...

Areas Of Interest:

Electronics: data communications, wireless communications, software, semiconductors

Healthcare: medical devices and diagnostics, healthcare services and information, biotechnology

We use the Net a lot for inter-company email. It's helping us do business more efficiently. We have received business ideas and plans via the Internet, and we are always interested in hearing about more. ■

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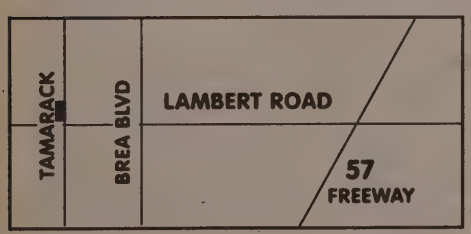

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- Enhanced 101 Keyboard
- Serial Mouse

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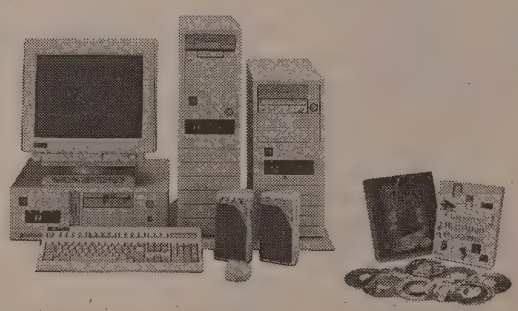

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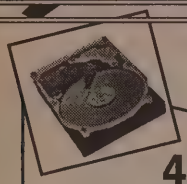

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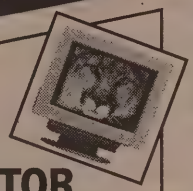

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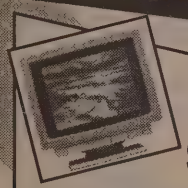

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 continued from page 102

connects to your computer with a regular modem cable. Power is supplied with a plug-in "wall cube" supply; that's all there is to the hardware.

Mounting the dish requires only ordinary hand tools and a convenient wall or post; aiming it requires you to follow simple instructions for using a compass to find the approximate point in the sky and listening for a tone in the receiver's speaker. Once you have "found" the tone, you adjust the vertical and horizontal angles for the loudest sound from the speaker, then tighten the nuts. Unless you have to dig a hole for a post, you can have the dish working in half an hour. (If I can do it, anyone can!)

This system is a boon to individuals and BBS operators for whom telephone calls to the nearest news feed are not practical. It is cheap enough that even well-connected systems could use it as a backup in case their regular news feed goes belly-up.

Note that this is a receive-only system; clearly, if it were the only game in town, there wouldn't be any news for anyone to read! In order to post news articles or to follow-up or reply to news you read, you'll still need to call a site with two-way connectivity. Since most people read much, much more news than they write, this isn't much of a burden.

User Satisfaction

A friend, Lynn Wheeler, and I have been receiving netnews for almost two years using two generations of Pagesat hardware. The first-generation system performed well, but reception sometimes faded in wet weather. The current product, with a 24" dish, provides much more signal margin for bad weather and has been rock-solid.

We picked a Bay Area business from Pagesat's customer list and asked the system operator how the Pagesat receiver was being used and how it performed. Daryl Jones of Telecomm Engineering in South San Francisco reported that he operates a UNIX service for his clients and that he used it as one of two news sources. "It certainly meets my needs, and it is a full feed—I'm not missing anything," he said. He was also happy with the way Pagesat upgraded his receiver at no charge and exchanged his dish for a larger one at a favorable price.

Jim Brennan, sysop for the Kingmont Astrophysical Observatory BBS in Loomis, CA, is another satisfied customer. He bought a Pagesat system to avoid the 35-mile netnews toll calls to Sacramento that were costing him as much as $400/month. He told us that after some early software problems (it worked, but not the way he wanted it to with his Wildcat BBS), he moved it to a Linux system where it is operating "flawlessly" now.

Pagesat is not without critics. Ironically, the most visible criticism is in a netnews group called biz.pagesat, where customer reports vary. One user claimed that aiming the dish was so difficult that he paid a satellite TV installer to do it for him. (Brennan, however, says that it took him five minutes to aim his.) Others have reported delays in transmission which could have been caused at Pagesat or elsewhere. A number of early users have upgraded to a larger dish for more signal fade margin.

Our experience with the system has been good, but your mileage may vary. An unobstructed view of the satellite is required, and the "offset feed" dish makes it appear to be looking higher in the sky than it is, so that hills or trees may be more significant obstacles than they appear to be. Software may not do what exactly you need or fit your operating environment without some work...check before you buy.

Bottom Line

Besides being fun to install and use, the Pagesat satellite netnews receiver system is an economical alternative to toll calls for data reception. Installing it requires some amount of technical fortitude and skill (more of the former than the latter), and it won't work in places where there isn't a clear shot at satellite K2. Some software tinkering may be required to configure the supplied programs to your environment, so ask lots of questions before you buy. ■

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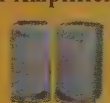
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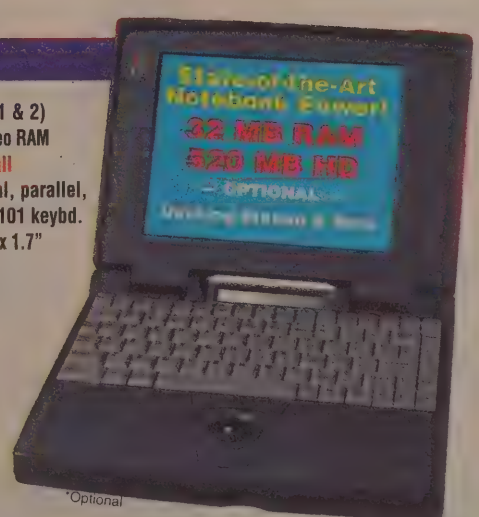

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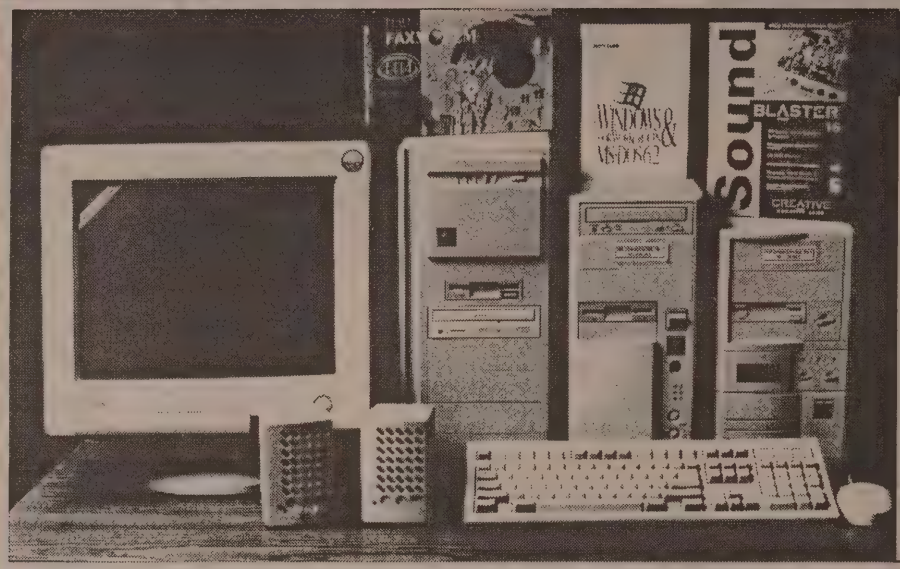

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firewalls have become so popular that it's hard to find an enterprise IP network that is not firewalled, and the total number of hosts on such consumer-capable networks is probably almost as large as the number on the supplier-capable core of the Internet. Hence many people now like to include these consumer-capable networks along with the supplier-capable core when discussing the Internet.

Mail, Lists, And News

But what about mail, lists, and news? Almost all the firewalled networks do let these communications services in and out, because they are batch, asychronous, and store-and-forward. Composing a message and delivering it are two separate processes. Further, mail doesn't even necessarily go to its final destination in one hop; repeated storing at an intermediate destination followed by forwarding to another computer is common, thus the term store-and-forward. USENET news uses somewhat different delivery mechanisms, but ones that are also typically batch, asynchronous, and store-and-forward.

Because it is delivered in this manner, a mail message or a news article is much less likely to be a security problem than a TELNET, FTP, Gopher, or WWW connection. This is why firewalls usually pass mail, lists, and news in both directions, but usually stop incoming connections of those interactive protocols. There are interactive communication services, such as IRC and talk, and those are usually firewalled just like other interactive protocols.

Because WWW, Gopher, TELNET, and FTP are basically interactive, you need IP or something like it to support them. Because mail, lists, and news are asynchronous, you can support them with protocols that are not interactive, such as UUCP and FidoNet. In fact, there are whole networks that do just that, including UUCP and FidoNet, among others. Because these networks are not interactive, they are not capable of supporting TELNET, FTP, Gopher, or WWW. We don't consider them part of the Internet, since they lack the most distinctive and characteristic services of the Internet.

Some people argue that networks such as FidoNet and UUCP should also be counted as being part of the Internet, since electronic mail is the most-used service even on the core, supplier-capable Internet. They further argue that the biggest benefit of the Internet is the

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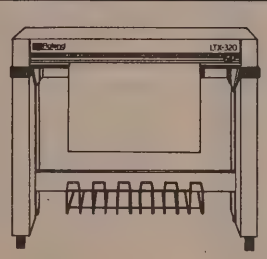
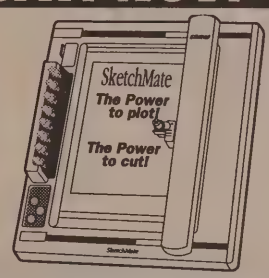

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community of discussion it supports, and mail is enough to join that.

Well, if mail is enough to be on the Internet, why is the Internet drawing such attention from press and new users alike? Mail has been carried across distributed computer networks since 1972 or 1973, but that's not what has made such an impression on the public. What has, are the interactive services and interfaces to them such as Mosaic; such interactive services have always distinguished the Internet from asynchronous networks such as FidoNet and UUCP. Besides, if being part of a community of discussion was enough, we would have to also include anyone with a fax machine or a telephone. Recent events have demonstrated that all readers of the *New York Times* would also have to be included. With edges so vague, what would be the point in calling anything the Internet? We choose to stick with a definition of the Internet as requiring interactive services.

Some people object to excluding the asynchronous networks from a definition of the Internet just because they don't support the interactive services. The argument they make is that FTP, Gopher, and WWW can be accessed through mail. This is true, but it's hardly the same, and hardly interactive in the same sense as using FTP, Gopher, or WWW over an IP connection. It's rather like saying a mail-order catalog is the same as going to the store and buying an item on the spot. Besides, we've yet to see anyone log in remotely by mail.

The Matrix

So what to call systems that can exchange mail, but aren't on the Internet? We say they are part of the Matrix, which is all computer systems worldwide that can exchange electronic mail. This term is borrowed (with permission) from Bill Gibson, the science fiction writer.

Other people refer to the Matrix as global email. That's accurate, but is a description rather than a name. Some even call it the email Internet. We find that term misleading, since if a system can only exchange mail, we don't consider it part of the Internet. Not to mention not everything in the world defines itself in terms of the Internet, or communicates through the Internet. FidoNet and WWIVnet, for example, have gateways between themselves that

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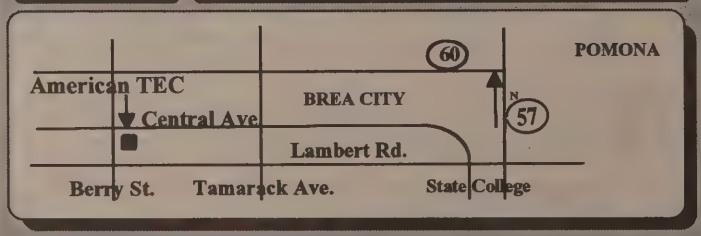

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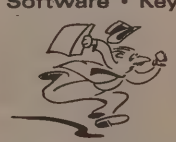

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have nothing to do with the Internet. Referring to the Matrix as the Internet is rather like referring to the United Kingdom as England. You may call it convenient shorthand; the Scots may disagree.

USENET And News

What about news? Well, the set of all systems that exchange news already has a name: USENET. USENET is presumably a subset of the Matrix, since it's hard to imagine a USENET node without mail, even though USENET itself is news, not mail. USENET is clearly not the same thing as the Internet, since many (almost certainly most) Internet nodes do not carry USENET news, and many USENET nodes are on other networks, especially UUCP, FidoNet, and BITNET.

A few years ago it was popular in some corners of the press to attempt to equate USENET and the Internet. They're clearly not the same. News, like mail, is an asynchronous, batch, store-and-forward service. The distinguishing services of the Internet are interactive, not news.

Is IP Characteristic Of The Internet?

We further choose to define the Internet as being those networks that use IP to permit users to use both the communication services and at least TELNET and FTP among the interactive services we have listed.

This requirement for IP has been questioned by some on the basis that there are now application gateways for other protocol suites, such as Novell Netware, that permit use of such services. This kind of application gateway is actually nothing new, and is not yet widespread. We choose to think of such networks, at least for the moment, as yet another layer of the onion, outside the core and consumer layers of the Internet.

Others have objected to the use of IP as a defining characteristic of the Internet because they think it's too technical. Actually, we find far fewer people confused about whether a software package or network supports IP than about whether it's part of the Internet or not.

Some people point out that services like WWW, Gopher, FTP, TELNET, etc. could easily be implemented on top of other protocol suites. This is true, and has been done. However, people seem to forget to ask why these services developed on top of IP in the first place. There seems to be something about IP and the Internet that is especially conducive to the development of new protocols. We make no apologies about naming IP, because we think it is important.

There is also the question of IP to where? If you have a UNIX shell login account on a computer run by an Internet access provider, and that system has IP access to the rest of the Internet, then you are an Internet user. However, you will not be able to use the full graphical capabilities of protocols such as WWW, because the provider's system cannot display on a bitmapped screen for you. For that, you need IP to your own computer with a bitmapped screen.

These are two different degrees of Internet connectivity that are important to both end-users and marketers. Some people refer to them as text-only interactive access and graphical interactive access. Some people have gone so far as to say you have to have graphical capabilities to have a full-service Internet connection. That may or may not be so, but in the interests of keeping the major categories to a minimum, we are simply going to note these degrees and say no more about them in this article. However, we agree that the distinction of graphical access is becoming more important with the spread of WWW and Mosaic.

Conferencing Systems And Commercial Mail Systems

Conferencing systems such as Prodigy and CompuServe support mail and often something like news, plus database and services. But most of them do not support the characteristic interactive services that we have listed. The few that do (Delphi and AOL), we simply count as part of the Internet. The others we count as part of the Matrix, since they all exchange mail.

We find that users of conferencing systems have no particular difficulty in distinguishing between the conferencing system they use and the Internet. CompuServe users, for example, refer to "Internet mail," which is correct, since the only off-system mail CompuServe supports is to the Internet, but they do not in general refer to CompuServe as part of the Internet.

Similarly, users of the various commercial electronic mail networks, such as MCI Mail and Sprint-Mail, seem to have no difficulty in distinguishing between the mail network they use and the Internet. Since they all seem to have their own addressing syntax, this is hardly surprising. We count these commercial mail networks as part of the Matrix, but not part of the Internet. Many of them have IP links to the Internet, but they don't let their users use them, instead limiting the services they carry to just mail.

Russian Dolls

So let's think of a series of nested Chinese boxes or Russian dolls, the kind where inside Boris Yeltsin is Mikhail Gorbachev, inside Gorbachev is Brezhnev, then Khrushchev, Stalin, Lenin, and maybe even Tsar Nicholas II. But let's only talk about three concentric layers: the Matrix on the outside, the consumer Internet inside, and the core Internet inside that.

	the core Internet	the consumer Internet	the Matrix
interactive services	supplier-capable	consumer-capable	by mail
	stores and shoppers	shoppers	mail order
asynchronous services	yes	yes	yes

Some people have argued that these categories are not sequential. They look sequential to us, since if you start with the core Internet and move out, you subtract

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services, and if you start at the outside of the Matrix and move in, you add services.

Some people have argued that these categories are bad because they are not mutually exclusive. Well, we observe that in real life networks have differing degrees of services, and the ones of most interest share the least common denominator of electronic mail. Thus concentric categories are needed to describe the real world. You can, however, extract three mutually exclusive categories by referring to the core Internet, to the consumer-only part of the Internet, and to asynchronous systems.

Outside The Matrix

In addition to computers and networks that fit these classifications, there are also LANs, mainframes, and BBSes that don't exchange any services with other networks or computers; not even mail. These systems are outside the Matrix. For example, many companies have an AppleTalk LAN in marketing, a Novell NetWare LAN in management, and a mainframe in accounting that aren't connected to talk to anything else. In addition, there are a few large networks such as France's Teletel (commonly known as Minitel) that support very large user populations but don't communicate with anything else. These are all currently outside all our Chinese boxes of the core Internet, the consumer Internet, and the Matrix.

DNS And Mail Addresses

There are other interesting network services that make a difference to end-users. For example, DNS (Domain Name System) domain names such as tic.com and domain addresses such tic@tic.com can be set up for systems outside the Internet. We used tic.com when we only had a UUCP connection, and few of our correspondents noticed any difference when we added an IP connection (except our mail was faster). This would be more or less a box enclosing the consumer Internet and within the Matrix. But the other three boxes are arguably the most important.

Some people have claimed that anything that uses DNS addresses is part of the Internet. We note that DNS addresses can be used with the UUCP network, which supports no interactive services, and we reject such an equation.

It is interesting to note that over the years various attempts have been made to equate the Internet with something else. Until the mid-1980s lots of people tried to say the Internet was the ARPANET. In the late 1980s many tried to say the Internet was NSFNET. In the early 1990s many tried to say the Internet was USENET. Now many are trying to say the Internet is anything that can exchange mail. We say the Internet is the Internet, not the same as anything else.

Summary

So, here we have a simple set of categories for several of the types of network access people talk about most these days. Any such categories are at least somewhat a matter of opinion, and other people will propose other categories and other names. We like these because they fit our experience of what real users actually perceive.

We invite our readers to tell us what distinctions they find important about the various networks and their services.■

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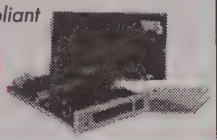

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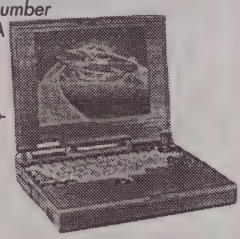

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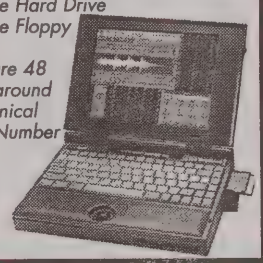

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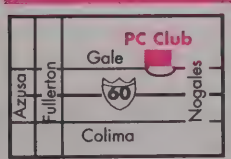

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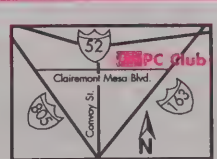

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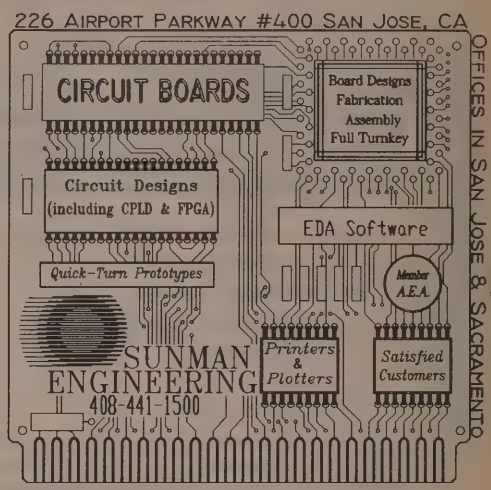

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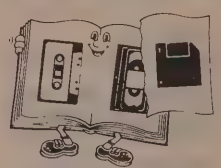

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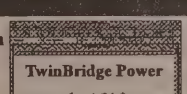

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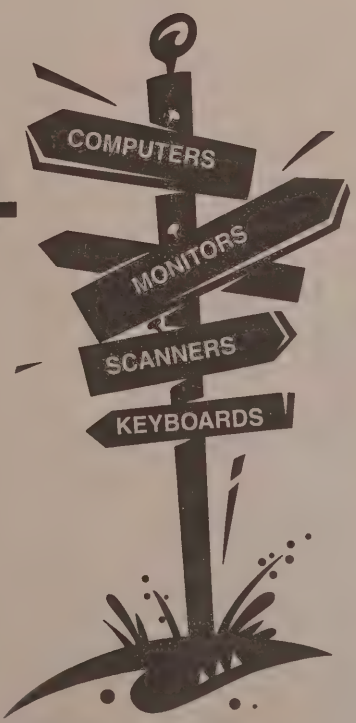

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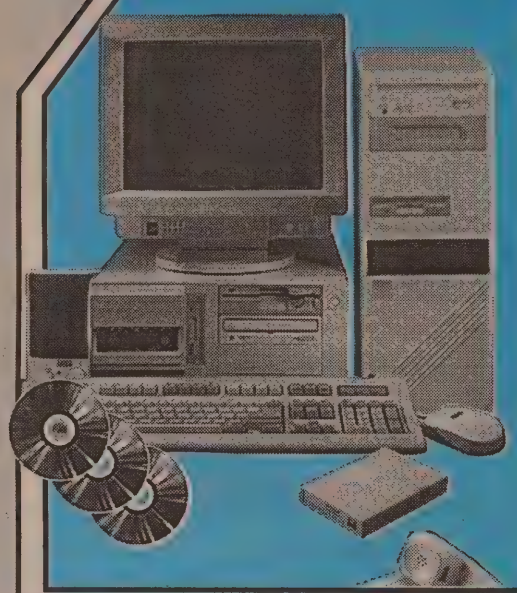

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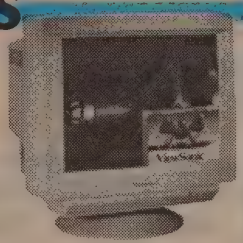

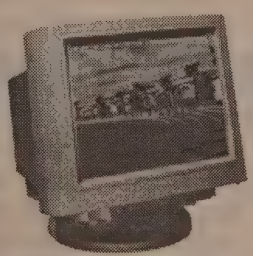

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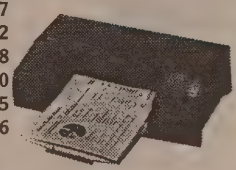

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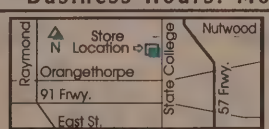

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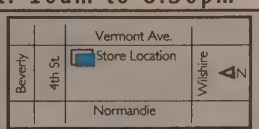

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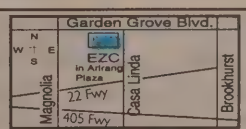

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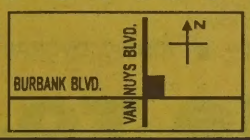

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Dvorak's Guide To Urban Folklore, Part 1

Or

How The Public At Large Has All The Best Comics

As many of you are aware, the Internet, as well as other public systems, has become a new conduit for Urban humor. This is a form of folklore whereby various jokes and cartoons are passed from person to person from office to office to be posted on walls and faxed to friends. In a typical folkloric fashion, the source of 99% of the material is lost; in fact, most of the humor is rewritten over and over as the recipients add their personal twists.

Years back, I was privileged to attend the Folklore classes at the University of California, where professor Alan Dundes regaled his students with Urban humor, and I have become an avid collector myself. While most of this stuff tends to be rewritten classical material, I was amused to find this rather new piece floating around the Net.

In fact five people shipped me a copy (two were from IBM).

The Top 11 Things People Think The 95 In Windows95 Really Stands For

11. The percentage that will be complete on the shipping date.
10. The number of floppies it will ship on.
9. The percentage of people who will have to upgrade their hardware.
8. The number of megabytes of hard disk space required.
7. The number of pages in the *EASY-INSTALL* version of the manual.
6. The percentage of existing Windows programs that won't run in the new OS.
5. The number of minutes to install.
4. The number of calls to tech support before you can get it to run.
3. The number of people who will actually *pay* for the upgrade.
2. The number of MHz required for the OS to run.

And now the #1 thing people think the 95 in Windows95 really stands for...

(Drum roll please...)

1. The year it was *DUE* to ship.

Personally I hate top-ten lists done in the Letterman style, but this one was pretty funny.

Cynicism seems to be a theme of Urban humor. A good example is this recent Question and Answer piece done about the Information Superhighway.

Q: What is the Information Superhighway?
A: It's just like the Internet, except:
- *it's a lot more expensive.*
- *you can't post and there's no killfile.*
- *there's no alt.sex.* or alt.drugs .*
- *rec.humor.funny has a laugh track.*
- *there's a commercial break every 10 minutes.*
- *everything is formatted to 40 columns for TV's.*
- *the free software costs you $2.00/megabyte to ftp, more for long distance.*

A: It's just like cable TV, except:
- *it's a lot more expensive.*
- *the picture isn't as good.*
- *there's 500 channels of Pay-per-View and home-shopping.*
- *you can watch any episode of Gilligan's Island or any Al Gore speech for only $2.00.*
- *no public access channels.*
- *there's a commercial break every 10 minutes.*

A: It's just like renting videos, except:
- *it's a lot more expensive.*
- *there's only 1/100th as many to choose from.*
- *no porno.*
- *there's no pause, fast-forward, or rewind, and it costs you another $3.95 if you want to watch twice.*
- *there's a commercial break every 10 minutes.*

A: It's just like the telephone, except:
- *it's a lot more expensive.*
- *there's no one to talk to.*
- *there's a commercial break every 10 minutes.*
- *every number is a toll call.*

I suspect that piece will be continually rewritten until it is very polished. From the looks of it that particular humor has not been worked on much by the public.

Next time: Elephant Hunters. ■

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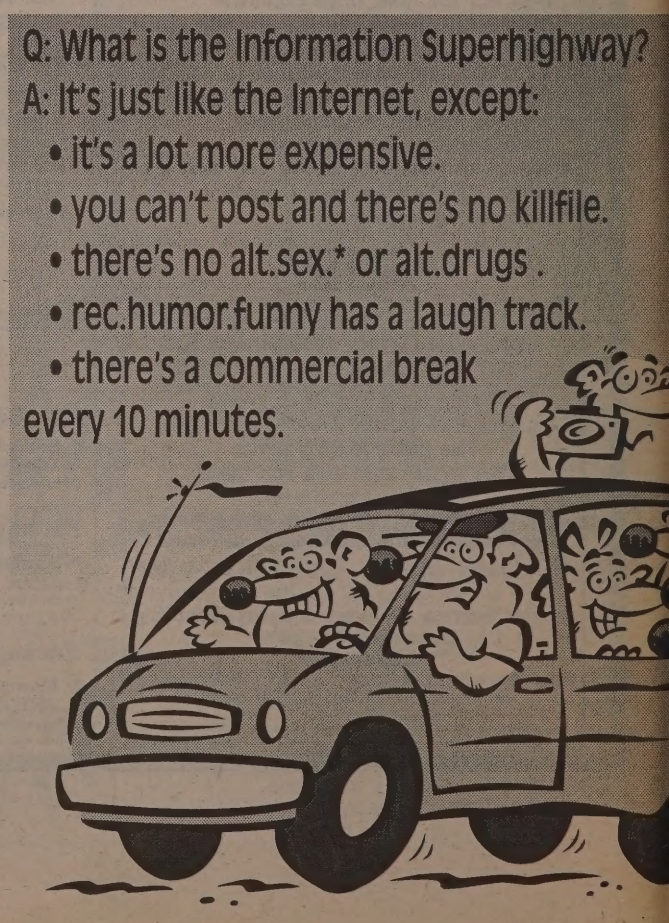
Q: What is the Information Superhighway?
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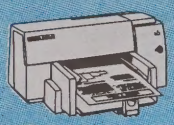

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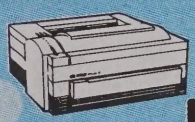

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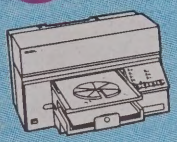

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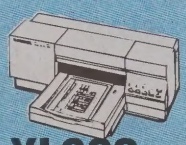

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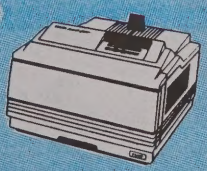

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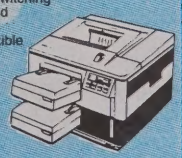

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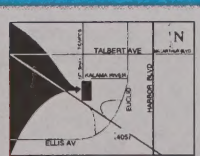

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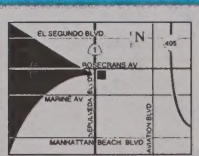

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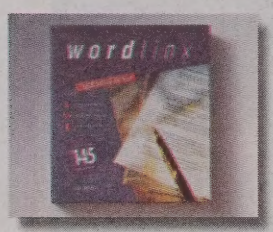
$199

with portable scanner $349



- New version supports Twain scanners.
- Works with scanners from: Hewlett Packard, Umax, Microtek, Mustek, Canon, Logitech and many others

Wordlinx by OCRON

A complete OCR program, featuring an embedding technology that allows invoking from your favorite Windows word processors!

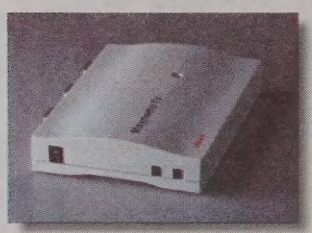
$69

- JPEG compression
- Gamma adjustment
- Supports Twain scanners, Tiff, Gif, JPG, PCD, EPS and PCX

ImageFolio by PROLAB

ImageFolio can flip and rotate, do chroma key backgrounds, lift images, display color variations, offers palette editing and image master database. 99% of Photoshop features at 1/5 the price!

$79



- Flicker free TV display
- 6 line buffer is double the size of the rest!
- Use with Mac, PC or notebook.

Maxmedia TV by UMAX

Features plug and play technology making it simple to use a color television display from your Mac, PC or notebook. Converter box and cables included.

$199

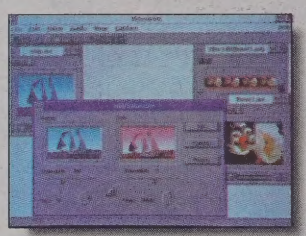
- 800DPI
- 4" scan width
- Intelligent Image Stitching

256 Grayscale **$89**

24bit color **$199**

MiniLook hand scanners by UMAX

Breakthrough pricing on these high quality scanners! They come complete with Perceive Personal OCR software and ProImage Plus image editing software.



- Filmstrip style display
- Frame by Frame Editing
- AVI file format
- Supports multiple video sources
- Runs in 4MB RAM

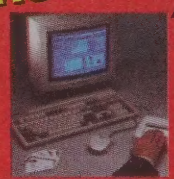
VideoWork by PROLAB

Try video image editing! VideoWork has over 100 transitions, audio and video special effects — including chroma key, image lifting and retouching tools.

$79

Monthly Madness!

OmniPage Pro
*with scanner purchase
$439



OCRON BCR Scanner and Software
$179

Robo Fax FAX ON DEMAND by FAXQUEST

Complete system answers incoming calls - faxing requested documents automatically! RoboFax contains card with voice and fax, software, speakers and microphone.

Single line PC version **$399**

Professional 4-line version $1,999

Advantage by POLARIS

The easy way to organize your day, your work and your life.

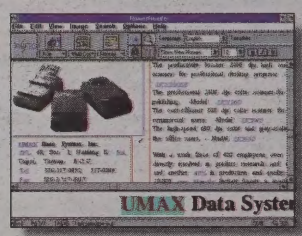
- Scheduling, • To-do notes,
- Month-day-week views, more

$79

BizCard Reader by UMAX

Simply the best way to input business cards into your contact manager. • Parallel port scanner and software

$195



- Page Segmentation
- QuickProof
- Deferred processing
- Poor Quality enhancement

PowerReader by UMAX

A stand alone Optical Character Recognition software featuring a powerful WSYWYG editor, retains formats,recognizes 11 languages, automatic Omnifont recognition. Easy to use, fast and accurate, great value.

$79

Business Card Reader Software Specials!

• Type free data entry • Direct link to ACT, PackRat, Advantage & other contact managers

BCR for hand scanner $59

BCR for Flatbed scanner $69

New hand scanners by Umax

Scan This (color) $189

Scan This (grayscale) $79

Perceive Personal by OCRON

The World's best selling OCR software for hand scanners... with over 1 million copies worldwide!

$59

1-800-214-7059

510-252-0267 FAX: 510-252-0536

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Call 510-252 0273 from your fax machine for a fax back data sheet on our products!

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